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VIEWS, NEWS AND INTERVIEWS.

It seemed necessary to the Elmira, N. Y., *Telegram* to use a three column satirical cut and one column and a half of text to explain to the people of Elmira why it was better to call for a number when using the telephone than to ask the central operator to "Give me the county jail, please."

Last week San Francisco and San Mateo, Cal., were united by an electric railroad. The San Francisco *Daily Report* very fittingly devoted one column of "scare heads" and the rest of its first page to a description of the opening orgies—should say, festivities. Many speeches were made. Mr. William M. Bunker, of the paper named, started his speech like this:

"Friends and Fellow Citizens: We are here to-day to tie two counties together with railroad track. Blest be the ties that bind them."

This was very Depew-esque, put the audience in good feeling and prepared them for the stem-wind-up:

"Encouraged by the prospects of the Nicaragua canal, stimulated by the success of electric roads, the old merchants of San Francisco will renew their youth and, acting with the people, will give the world another exhibition of their pluck and power."

Mr. Bunker's speech was frequently applauded, and was listened to throughout with great attention.

Gutta-percha has now become so scarce that the price is about $1.30 a pound, and the importations to this country have gradually decreased until now they are about nominal, and there is very little of it reported for sale in our markets.

Electricians are glad to see the good and solid construction used on the Broadway cable road. It will do very well for an underground conduit electric railroad.

"Tell your electrical friends," said a globe-trotter, "that there are good and cheap tailors in Montreal. I go there twice a year for clothes and save enough to pay the expenses of my two trips."

An electrical engineer who was exasperated at several things that had gone wrong, mopped his perspiring brow and remarked, "*De animis non curat lex*; which is to say, It doesn't do a d—n bit of good to kick."

The Hon. John J. Ingalls, that astute and brainy "statesman out of a job," delivered a brilliant lecture on Staten Island recently. In explaining that no man was debarred by statute from becoming a success, the speaker reverted to the invention of the telephone. "When I was a boy in Massachusetts," said he, "I remember that I would place my ear at one end of a spar 90 or 100 feet long while one of my playmates scratched on the other end with a pin. I could hear the pin scratching as plainly as if there were nothing but a thin partition of cardboard next my ear. I now realize that Nature was trying to tell me about the telephone. I had a chance to invent the telephone: there was no law to prevent my inventing it and becoming as rich as Bell."

Sad Fate of the Inventor's Trained Rat.

When an inventor or promoter has a scheme which he wants to bring before the public he endeavors to interest Messrs. Widener and Elkins in it, says the Philadelphia *News*. For the use of their names the promoter will give a liberal block of stock and offer all sorts of tempting inducements, but under no consideration will the men lend their influence to any project unless they believe that it is practical and will bring a fair return for the investment. The inventors and promoters understand this perfectly, and they exert every effort to make a convincing demonstration of the merits of their project when they appear before the two capitalists.

The other day an old inventor of this city, believing he had something which would catch the street-car magnates, it being a motor car for street railways, went to lay his invention before the gentlemen. The motor car is propelled by some peculiar force. It is built about one half the size of an ordinary car, but instead of carrying passengers has a compartment for a single horse, by which the force is to be generated. The inventor had constructed a beautiful little model, which he exhibited to Messrs. Widener and Elkins. In showing how it was worked the inventor, instead of using a horse, which is many times the size of the car, used a trained white rat, which was his great pet. A good deal of time and patience had been spent in training the little animal and getting it into working order.

After many days of patient attempts, the enthusiast succeeded in getting the rat to enter the little compartment in the motor car and work the motor. Through the rooms he had built a diminutive railway. Placing the motor car on the tracks he attached another little passenger car, a model showing both a patent car coupler of his invention and an automatic arrangement for registering fares of passengers as they enter. He then sat on the passenger car, and the rat, in working the motor, drew him from one end of the line to the other. With the power of a horse working the motor the number of passengers that could be carried would be much larger than that carried in the ordinary horse cars.

The capitalists were invited in to witness the extraordinary performance. The inventor was in high glee, and after a long address extolling the merits of his invention the rat was brought forth to make a practical demonstration of the new motive power. During its first trip the little creature fell over the side of the machine upon the floor and broke its neck. This put a sudden end to the negotiations, and it still remains for a syndicate to be formed to push the new motor. So attached was the inventor to the rat that he buried it in his back yard in a neat casket and erected a small tombstone over its grave.

Rodent power stock is below par.

Fig. 1.—Electricity Building for World's Fair.

World's Fair Buildings.

Interest in the World's Fair is on the increase, especially among foreign nations. Large areas of space have already been requested, and the plans and specifications for a number of the buildings are completed.

We present in this issue illustrations of four of the principal buildings. The electrical interests are being carefully watched by Chief Electrician J. P. Barrett, who is making every effort to have his part of the Fair a thorough success. Some of the electrical companies have already designed and commenced to manufacture especially handsome apparatus for exhibition.

The building devoted to the electrical industries promises to be in every way worthy of the important exhibit it will hold. This building, shown in Fig. 1, covers a space of 700 by 350 feet, or more than five and one-half acres. Like most of the other buildings, the style of architecture is Italian renaissance. It is 60 feet high, and ornamented with designs suggestive of the department. It is one of the handsomest of the grand central group, and will cost $650,000. There will be four entrances to the building, the main one on the South. It will be built of a material resembling granite in color. A statue of Franklin will rise conspicuously before the South entrance.

The main machinery building, Fig. 2, measures 850 by 500 feet. It is spanned by three arched trusses, and the interior will present the appearance of three railroad train houses, side by side, surrounded on all the four sides by a 50 foot gallery. The trusses are to be built separately, so that they can be taken down and sold for use as railroad train houses, and it is hoped to have iron trusses instead of cheaper ones, which may, however, be necessary. In each of these three long naves there is to be an elevated traveling crane, running from end to end of the building. These will be useful in moving machinery, and when the Exposition opens, platforms will be placed on them and visitors will view from these the entire exhibition at a great saving of tramping.

Shafting for power will be carried on the same posts which support these traveling bridges. Steam power will be used throughout this main building, and this steam will be supplied from a main power house adjoining the South side of the building. The exterior toward the stock exhibit and the railroad is to be of the plainest description. On the two sides adjoining the grand court the exterior will, however, be rich and palatial. All the buildings on this grand plaza are designed with a view to making an effective background for displays of every kind, and in order to conform to the general richness of the court, are enriched with colonnades and other architectural features.

New Edison Station in Brooklyn.

The Brooklyn Edison Illuminating Company have found that their Myrtle avenue station, which supplies 37,000 incandescent lights, 750 arc lights and 500 horse-power to motors, is not large enough. A temporary station, to cost $30,000, will be erected at once, pending the building of a $400,000 station, the site for which has not yet been selected.

The Fort Wayne Company gets the Wheeling Contract.

The electric light commission of Wheeling, W. Va., which has just completed an extensive inspection of electric lighting plants in all the large cities, has awarded the contract for lighting the city of Wheeling to the Fort Wayne Electric Company, of Fort Wayne, Ind. The work is to be done in conformity to plans and specifications as prepared by Mr. John A. Seely, consulting engineer to the city.

The contract calls for six 80 light Wood dynamos and two Hamilton-Corliss engines, with clutches and shafting. The bid of the Fort Wayne Company was $85,420. Mr. C. S. Knight, of this company, is to be congratulated for securing the contract. The Fort Wayne people will also furnish a large plant to Grand Rapids, Mich.

The design follows classical models throughout, the detail being borrowed from the renaissance of Seville and other Spanish towns, as being appropriate to a Columbian celebration. As in all the other buildings on the court, an arcade on the first story permits passage around the building under cover; and, as in all the other buildings, the fronts will be formed of "staff," colored to an ivory tone. The ceilings of the porticoes will be emphasized with strong color.

A colonnade with a cafe at either end forms the connecting link between machinery and agricultural halls, and in the center of this colonnade is an archway leading to the exhibits. From this portico there will be a view nearly a mile in length down the lagoon, and an obelisk and fountain placed in the lagoon between the two buildings, agricultural and machinery, will form a fitting Southern point in this vista.

The machinery annex will be placed in the rear of the administration building and in the loop formed by the railroad tracks. It will be entered by tunnels or subways, as well as by bridges, from machinery hall and the buildings for administration, mines and transportation. It is to be a very large but very simple building. While in the main machinery building a railroad train house is the type, in the annex a mill or foundry will be considered the model for construction. It is all to be built of wood in the most simple and economical manner. Its shape, however, is peculiar. It is to be annular in form, the outer diameter being 800 feet and the inner diameter 400 feet. The building will have a nave 100 feet wide, with a 50 foot wide lean to in one story on the inside, and a 50 foot wide lean-to on the outside. Within the inner circle will be a park in which visitors fatigued by the hum of machinery may rest. The annular form chiefly commends itself because a circuit electrical railway can run continuously around the entire main nave, and passengers in it can see the entire exhibit without leaving the cars; and machinery can be easily moved by this means. The power will be transmitted by shafting crossing the building at each bay, with a motor at each shaft. Electrical power will be used in the annex, and steam power in the main machinery building.

Attached to this great annex will be the power house, convenient to the tracks for coal supply, etc., containing an immense display of boilers, while in the adjoining portion of the annex building will be established the enormous plant of engines and dynamos. This will probably be the largest and most interesting display of electrical power ever made. It is possible that gas will be used instead of coal for fuel beneath the boilers, and in that case a building will be prepared for making this gas.

The style of architecture of the mines building, Fig. 3, is classic, and its dimensions are 700 by 350 feet. The height of the main cornice is 65 feet. There is an entrance on each side of the building, the grand entrances being at the North and South end. These are 110 feet high and 32 feet wide, each opening into a vestibule 88 feet high and elaborately decorated. At each corner of the building there is a pavilion 68 feet square and 90 feet high, surmounted by a dome. A balcony 60 feet wide and 25 feet high encircles the building, and leading to it are eight stairways. The roof is of glass, 100 feet from the floor. The cost will be $350,000.

The administration building, Fig. 4, is the gem of all the architectural jewels of the Exposition. Constructed of material to last but two years, it will cost $650,000. Although it covers a space but 250 feet square, yet it is one of the noblest achievements of modern architecture. It will occupy the most commanding position on the Exposition grounds. The building consists of four pavilions, 84 feet square, one at each of the four angles of the square of the plan, and connected by a great central dome, 120 feet in diameter and 260 feet high. In the center of each facade is a recess, 93 feet wide, within which is a grand entrance to the building. The first story is in the Doric order, of heavy proportions. The second story, with its lofty colonnade, is in the Ionic order. Externally, the design is divided into three principal stages. The first stage consists of the four pavilions, corresponding in height with the buildings grouped about, which are 65 feet high. The second stage is of the same height, and is a continuation of the central rotunda, which is 175 feet square. The third stage is the base of the great dome, 40 feet high and octagonal in form, the dome itself rising in graceful lines, richly ornamented with heavily molded ribs and sculptured panels, and having a large glass skylight. The interior effects will be even more gorgeous than the exterior, resplendent with carvings, sculptures and immense paintings.

FIG. 2.—MACHINERY HALL FOR WORLD'S FAIR.

An Insulated Wire and Cable Company.

A certificate of the organization of the Crescent Insulated Wire and Cable Company has been filed at Trenton, N. J., by Richard R. Whitehead, C. Edward Murray and Harry T. Solliday, all of that city. The company propose to manufacture an insulated compound for the covering of wires and cables, and the manufacture of electrical appliances of all kinds. The total amount of capital stock is $50,000, divided into 500 shares, with $100 the par value of each share. They will commence business with $15,000. The principal place of business in this State will be Trenton, and the place outside of the State will be New York city. Messrs. Whitehead and Murray are the chief owners.

Running Alternate Machines in Parallel.

Some tests have recently been made at Messrs. Willans & Robinson's, to show that with Willans engines alternate current machines can be run in parallel with perfect ease and certainty. It has been maintained that two engines, though running at the same number of revolutions per minute, do not run at the same speed throughout each revolution, that is to say, do not run uniformly, so that two direct driven alternate machines may be put out of step by them. Experiments with Willans engines do not disprove this assumption, as the engines are small and run at high speeds, so it is not likely that they would give rise to this trouble. It is doubtful, however, whether any engines really do give trouble. There seems to be a stubborn determination in some quarters to insist that alternating machines cannot be run in parallel. Such ideas must be rather out of date now, however, for not only has it been shown experimentally that machines will run in parallel, but they are actually so run in some stations, and in Switzerland transmission of large powers by alternating motors is rapidly becoming common.

On the other hand, it is difficult to know why all alternating machines are not run in parallel. The Brompton machines, for instance, run perfectly in parallel. It is said that the Manchester Square machines do not. Probably engineers make unnecessary difficulty about the matter, take very many precautions, and think the whole thing so complicated, that they fail. Such things as synchronizers for use with Mordey machines, for instance, are unnecessary, and are perhaps awe-inspiring survivals of the days when alternators were more mysterious. All that is necessary is to put a lamp in series with one coil of each dynamo, and when the lamp goes out the machines are in step. It is simpler still to couple the machines in parallel through a resistance without troubling to see if they are in step or not. The resistance will prevent excessive current or excessive forces or danger, and it will allow enough control to bring the machines into step. After a few seconds it can be short circuited out. We believe that, under the personal supervision of Mr. Mordey, any large alternators would run in parallel.—*Industries.*

The Reporter's Lot.

City Editor - The street is all excitement. An electric light wire has blocked traffic, and no one knows whether it is a live wire or not.

Editor—Detail two reporters to go to the wire immediately—one to feel of it and the other to write up the result.—*New York Weekly.*

Research and Invention.

[F. W. Clarke, in the *Popular Science Monthly* for August.]

During this century nine-tenths of the great discoveries have been made by men with institutions back of them, through the aid of which the work was rendered possible. Wealth, scholarship, ability and the spirit of research, too, seldom go together; and happy is the man in whom all these conditions are fortunately united. The truth of my last statement may be verified by a reference to the files of those standard scientific journals in which original researches are recorded, or by scrutinizing in detail the history of any great discovery. In either case, whether we consider this country or Europe, the university work will be found to predominate overwhelmingly and for obvious reasons. Every true university is something more than a distributer of knowledge; it a producer of knowledge also; and in Germany, where the university system is most fully developed, the two functions are equally recognized. A German student, aspiring to academic honors, must do original work, and the professors' chairs are always filled from among the men who have most distinguished themselves as investigators. A chemist who has done nothing for pure science could hardly be recognized in Germany; not one of the higher professional positions would be within his reach; erudition alone, unsustained by evidence of creative ability, would do little for his advancement. In consequence of this policy, Germany now leads the scientific world; and in consequence of that leadership, a certain industrial supremacy is fast becoming hers. One example will serve to illustrate the tendency to which I refer. The aniline dyes were discovered by Perkin in England about 35 years ago, and in that country the manufacture began. To-day, through the researches of German universities, Germany is the center of the coal-tar industry, and England has only a subordinate rank. Until recently the English universities have slighted experimental science, and English manufacturers are paying for the neglect. One German firm alone, producers of coal tar colors, employs over 1,400 workmen; but with them there are about 50 scientific chemists, every one a man trained in pure research, the product of the university system. These men are engaged to make investigations; to improve processes; to discover new compounds of value; and, in short, to use the most vigorous methods of science for the up-building of industry. The German manufacturer does not employ a chemist who has only learned by rote the wisdom gained by others; he does not ask to be told that which he already knows; he seeks rather to push forward into new fields; to excel his competitors more by intelligence than by brute force; and to gain a growing supremacy in preference to a mere victory for the moment. This practical policy, the outgrowth of intellectual culture, has made Germany a dangerous rival to all other countries in those departments of industry which rest upon scientific foundations. Applied science cannot exist until there is the science to apply; and, where the latter is most favored, the industrial development is sure to be the most perfect. This lesson is one which the United States must learn more thoroughly than heretofore, if it hopes to hold its own in the front rank of manufacturing nations. In a few of our universities the truth is already realized; but in too many American schools the so-called "practical" view prevails. Under the latter, teaching becomes routine, and the student, while learning elaborately that which is known, is not taught how to discover. He has little or no training in the art of solving unsolved problems; and that art is the mainspring of modern industrial growth. A teacher of science ought also to be an investigator, were it only for the inspiration that his example might give to the pupils in his charge. To impart knowledge is a good thing, but to reveal the sources of knowledge is better; and in that revelation is found the educational value of research regarded as a part of the teacher's essential duty.

Taking the Temperature by Tuning-Forks.

[J. T. N. in *English Mechanic and World of Science.*]

Perhaps some of our readers would hardly have suspected that there exists any connection between acoustics, or the science of sound, and the science of heat; but we would remind such that there is a general harmony amongst all the laws of the sciences, and as regards the phenomena which they govern, it must be remembered that they are all manifestations of the same "something," which we call *energy*. Sound and heat are surely not more widely different than are mechanical work and electric light, yet how easy it now is to obtain illumination by driving a dynamo.

A suggestion recently made by Mr. S. Tolver Preston, of Hamburg, indicates very definitely one relation which sound may have to heat. He proposes to estimate temperature by means of tuning-forks! The idea, as expounded in the current issue of the *Philosophical Magazine*, is simple enough, and relates to the well-known fact that the note emitted by a resonance tube varies according to the temperature of the air which it incloses, and Mr. Preston's notion is to employ this in some way as a measure of temperature.

One of the simplest aspects of the case may be thus illustrated: Suppose a tube, closed at the inner end, to be inserted somewhere in the wall of a furnace, or buried in some heated substance whose temperature it is desired to ascertain. Now, a tuning-fork of a certain vibrating period will, at normal temperature, vibrate in resonance with a tube possessing a certain length. It will be seen at once, therefore, that by changing the temperature of the tube, or of the substance in which the tube is buried, the tuning-fork will not respond. Another fork of a different vibrating period must now be selected in order to resound with the tube.

It has been shown by the dynamical theory of Maxwell that since the pressure of a gas depends on the motion of its particles, the velocity of the propagation of sound depends on the normal velocity of the gas particles or molecules; in fact, that the sound-wave moves independently of the density and pressure of the gas. This applies, as will be at once apparent, to our proposed acoustic thermometer. For it is this normal motion of the molecules of the gas in the tube, the energy of which motion we call the "temperature," which is the sole factor in determining the velocity of sound, of which the tuning-fork employed with the tube is the mechanical indicator. The velocity of sound being as the velocity of the gaseous molecules, and the velocity of the molecules being as the square root of this energy, then, since the temperature *is* the energy, the velocity of sound in a gas is proportional to the square root of the temperature.

If we have a tuning-fork whose vibrating period is mechanically adjustable, it is easy to perceive, then, from the above, that the temperature in the tube is inversely proportional to the square of the vibrating period of the fork. Or, if the length of the tube be adjustable—for instance, if the tube be telescopic—the temperature of the air in the tube, and, therefore, of the heated receptacle, or what not, in which the tube is placed, is evidently proportional to the square of the length of the adjustable tube.

Now, zero Centigrade being 273 above the absolute zero, the Centigrade zero is then, of course, 273, expressed as absolute temperature. At 273 above zero Centigrade (which is 546 of absolute temperature), the molecules of the air have, of course, twice the energy they have at zero C. At 4×273 absolute temperature (819 above zero C.) the molecules of air will possess, in the same way, four times the energy possessed by them at zero C., and, therefore, twice the velocity which they had at zero C. (velocity being as the square root of energy). Sound would then be propagated in air in such a tube whose temperature is 819° C. at twice the velocity of its transmission in air at 0° C. So that a tube of air at 819° C. would be in resonance with the same tuning-fork as a tube of half the length resounds to at 0° C. It is evident, therefore, that by varying the length of a telescopic tube, and employing a constant fork, we shall serve the same object as (conversely) varying the vibrating period of an adjustable fork and keeping the length of the tube constant.

These are the theoretical considerations as given by Mr. Preston in the *Philosophical Magazine*. Some may see a way to propose some practical form of acoustic thermometer based on these principles, and to suggest some mechanical modifications which might make such an instrument extremely sensitive. We commend the notion to our organ-building subscribers.

Interurban Mails via the Electric Cars.

The interurban mail service between Minneapolis and St. Paul, Minn., by means of the electric car line, is about to be put in operation, and soon the twin cities will have the benefit of the half-hour mail service between the hours of 7.30 A. M. and 4.30 P. M.

In the past a letter mailed in either city later than 2.30 o'clock in the afternoon, would not be delivered in the other city until the next morning. Under the new arrangement, however, a letter mailed on the cars as late as 4.30 P. M. will be delivered the same afternoon if directed to the business portion of either city.

This is claimed to be the first instance on record where the electric car service has been utilized for the transportation of United States mails. The mail boxes, which have been built especially for the service, will be placed on the closed motor cars, near the rear platform, and will be convenient for mailing letters from the ground or from the car itself.

The boxes are being manufactured at the power house of the street railway company. They are constructed of sheet iron, and are light and simple, and at the same time strong and ornamental. In size they are about 18 inches high and a foot in width, and are painted a bright yellow to correspond with the color of the car, and not the traditional green. They do not differ so much from the regular mail box but that they can be readily recognized.

In a conspicuous place towards the street is painted the words "U. S. Mail," making it almost impossible for a person to make a mistake. The slot for inserting the letters is in the end towards the rear of the car, and is protected in the usual way by a huge cover. The letters are taken out the same as in other boxes by the post office employés.

The boxes are attached to the cars by means of two hooks, the bottom resting on the car moulding. The mail will not be taken from the boxes on the cars, but the box will be carried to the post office and then emptied of its contents. A brass handle on the top of the box provides for convenience in carrying it to and from the post office.

The first mail will leave both cities on the 7.30 A. M. car, and every half hour thereafter a mail car will start until 4.30 P. M. Letters mailed later than that hour will go by the former route and be delivered the next morning. The new service is intended for letters only, no papers or parcels being allowed to be mailed on the car. In both cities the boxes will be detached from the car at the point nearest the post office and another box placed in its stead.

The scheme is due more to necessity than to the ingenuity of any one person, and is apparently the spontaneous outgrowth of the desire for better mail facilities between the two cities and the success of the interurban electric cars.

The idea has been talked of for months past, and, finally, upon presenting the subject to the postal authorities at Washington, Captain Perkins, superintendent of mails for this division, was allowed to try the experiment. No objection was offered by the street railway company, and so in a few days the half-hour mail service will be in practical operation.

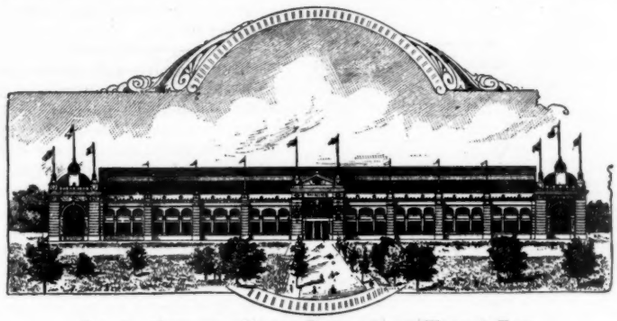

FIG. 3.—MINES AND MINING BUILDING FOR WORLD'S FAIR.

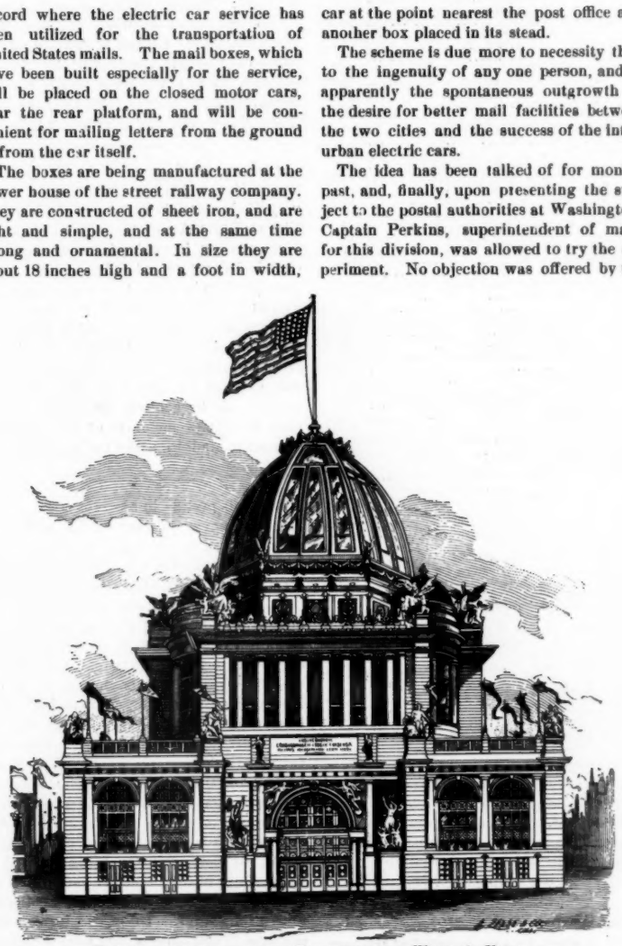

FIG. 4.—ADMINISTRATION BUILDING FOR WORLD'S FAIR.

It is estimated that 20,000 horse power will be required for the electric lighting plant of the Columbian Exposition.

At a meeting of the board of directors of the Flushing and College Point, L. I., Electric Street Railroad, the officers elected were: Joseph Dykes, president; E. P. Stratton, vice-president; David Masters, secretary; John Hepburn, treasurer.

Seattle, Wash.—Citizens' Light and Power Company; capital, $50,000.

Manchester, N. H.—Electric Lighting Company; capital, $10,000.

Appleton, Wis.—Appleton Edison Electric Company; capital, $100,000.

Philadelphia, Pa.—Tottrell Insulated Wire Company; capital, $200,000.

Chicago, Ill.—Chicago Electric Manufacturing Company; capital, $10,000.

Radford, Va.—Radford Water, Light and Power Company; capital, $1,000,000.

Mt. Pleasant, Pa.—Mt. Pleasant Electric Street Railway Company; capital, $50,000.

Ashland, Pa.—The Ashland & Centralia Electric Railway Company; capital, $20,000.

Chicago, Ill.—Norwood Park & Maine Electric Railway Company; capital, $250,000.

Cambridge, N. Y.—The Cambridge Electric Light and Power Company; capital, $7,000.

Portsmouth, Va.—Virginia City Company, to establish water, gas and electric plants; capital, $1,000,000.

Astoria, Ore.—Astoria Improvement and Construction Company, to build telegraph lines, etc; capital, $100,000.

Allegheny City, Pa.—The Spring Hill Street Railway Company, to operate an electric street railway; capital, $12,000.

Youngstown, O.—The Youngstown Street Railway Company, to construct and operate a street railway by electric or other power; capital, $500,000.

Kankakee, Ill.—Enterprise Electric Light and Railway Company; capital, $100,000. Incorporators, Thomas H. Magunder, August D. Ehrick and William A. McGillis.

Portland, Me.—The Rowe Manufacturing Company; capital, $500,000; has been organized for the purpose of manufacturing electric lamps. The officers are: President, Charles E. Rowe, of Chelsea, Mass.; treasurer, John W. Fletcher, of Chelsea, Mass.

Pittsburgh, Pa.—The Pittsburgh Underground Electric Company has been organized with the following officers: C. D. Robbins, president; D. J. Rex, secretary; directors, C. P. Shoemaker, F. A. Mann, F. J. Osterling and John J. Miller. The capital stock is $300,000, of which $96,000 is paid in.

Report of the Commissioner of Patents.

Mr. Charles E. Mitchell, whose resignation as Commissioner of Patents went into effect on August 1, has filed the report of the operations of his bureau during the fiscal year ended July 1, 1891. The report shows that applications for patents, etc., were received as follows: Applications for letters-patent, 39,696; applications for design patents, 1,146; applications for re-issue patents, 111; applications for registration of trade-marks, 1,855; applications for registration of labels, 808; caveats, 2,333. Total, 45,949.

There were during the same period 25,307 patents granted, 1,744 trade-marks registered and 289 labels registered. The receipts from all sources aggregated $1,302,794, and the expenditures $1,145,502. The total balance in the treasury to the credit of the patent fund was, on July 1, 1891, $3,947,847. Mr. Mitchell makes an urgent appeal for additional room and for increased salaries for the principal examiners of the bureau.

OBITUARY.

John P. Epper, 23 years of age, manager of the Western Union Telegraph Company at Suffolk, Virginia, was shot dead by an unknown assassin one night last week.

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Last week a New York bartender reached for a bottle of rum near an electric motor and fell dead. The daily papers announced at length, under scare heads, that a man had been killed by 400 volts of electricity. The coroner said it was apoplexy.

The Atlanta, Ga., *Constitution* sounds a tocsin of alarm by announcing that the present supply of telegraph poles is being rapidly exhausted, and that in a few years we shall have no source of supply. Our Southern contemporary is needlessly startled. When an electrical engineer wants anything, he gets it—or invents it, which is much the same thing to a brainy man.

The large number of electric railways which has been built and equipped during the present season is an encouraging sign of the times. The car horse is rapidly becoming a thing of the past, to the great relief of the overworked brute. Cleaner and less crowded streets increased convenience to the public, are some of the popular elements in this change of transit methods.

It looks as if the electrical execution law would have to go.

After Saturday of last week the Rhode Island clams know what electrical execution means.

The electric lighting business continues to expand. There is no greater field in this industry, and improvement is still the order of the day everywhere in it.

The "Prophet" of the ELECTRICAL REVIEW has been deer stalking and bass fishing in the deep recesses of the forests, and also communing with nature and things. His interesting prophecies and suggestions (in answer to numerous inquiries) will be resumed next week.

The Baltimore press and public have organized an attack upon "that grinding, grinning, ghoulishly gleeful monopoly, the telephone company." This is a very unwise and infantile proceeding, and not worthy of Baltimore. Let the telephone company suspend business entirely for six months and await the result.

In addition to the *Daily News*, the Grand Jury has found seven more indictments for the violation of the Gerry law, which forbids the publication of the facts about electrical executions. This is the list of persons indicted: William M. Laffan of the *Sun*, Joseph Pulitzer of the *World*, Bradford Merrill of the *Press*, George W. Turner of the *Recorder*, Albert H. Hœckley of the *Morning Journal*, John A. Cockerill of the *Morning Advertiser* and Charles R. Miller of the New York *Times*. The *Tribune* was not indicted.

The outlook for a great electrical exhibition at Montreal is very promising, and it is very likely that this meeting of the National Electric Light Association will carry off the highest honors in awakening new interest in electrical development and progress. Make your plans to be present, and remember the date of beginning, September 7 next. The sessions of the convention will be held from ten o'clock in the morning until two o'clock in the afternoon, at which hour the meeting will adjourn for the day. An executive session will be held on September 10 to elect three new members of the executive committee and to name the next place of meeting.

Boston is prolific in new electrical work. Just now a new claimant for honors in electrical welding or forging is receiving attention. An exhibition was given last week by Mr. Geo. D. Burton. The press accounts state that one experiment was the melting into liquid form of a bar of steel an inch in diameter and 12 inches long, in 45 seconds, without the temperature of the room being raised a single degree from its normal condition. Another thing shown was the making of a steel railroad spike. The bar was cut into the required length, the pieces passed through the electrical machine, where one end was heated, and then to a die, which shapes the head onto the heated end, the point being compressed into shape without heating. Another exhibit was the forming of an auger screw, the flat bar of iron being fastened in the machine at the two ends and heated almost instantly, and then twisted into the required spiral by the automatic turn of the machine. These experiments were witnessed by Dr. W. H. Wahl, Prof. Van der Weyde and others.

REPEAL THE ELECTROCUTION LAW!

The ELECTRICAL REVIEW has advocated the repeal of the electrical execution law ever since the passage of that infamous act by the New York Legislature. We have set forth at length our own views and those of prominent electrical people.

But a scientific journal cannot wield in such matters an influence as powerful as that of the daily press. The newspapers did not seem to care much about the matter till they discovered that Warden Brown intended to enforce that little gag clause relating to publishing full reports of executions. Now the papers are thoroughly aroused on the question of the freedom of the press, and they, and we, intend to fight for it. Such a struggle may, and let us hope will, result in the repeal of the law as a whole.

The New York *Sun* has assumed the championship of its contemporaries by publishing three columns of interviews with prominent politicians. The article begins with this:

"We propose to lay before the men of all parties who are nominated to high office in this State, or who are likely to be nominated, two simple questions, as follows:

THE QUESTIONS.

"*Are you in favor of maintaining the electrical execution law with all its features as it is?*

"*Or are you in favor of the repeal of the law, and especially of the repeal of that part of it which forbids the newspapers to ascertain the facts of death when legally inflicted, and to publish them for the information of the people?*"

In addition, Mr. Charles A. Dana, the eminent editor of the *Sun*, wrote a column editorial of which the following is a portion:

"Of the distinguished gentlemen whose views on the electrical execution law are published on another page, the Hon. Roswell P. Flower, the Hon. Edward F. Jones, Judge Alton B. Parker, the Hon. William F. Sheehan, Dr. Chauncey M. Depew, the Hon. Cornelius Van Cott, the Hon. Stewart L. Woodford and Secretary Tracy, are straight and emphatic in their declaration for a repeal of the section restricting the liberty of the press. Here are four democrats and four republicans. They are all all right.

"We earnestly urge our esteemed contemporaries throughout the State to subject every candidate for executive or legislative office this fall to the test herein set forth: Is he in favor of the gag law which now disgraces the statutes, or is he for its immediate and unconditional repeal? Let no candidate for any office of importance, for Governor, for Lieutenant-Governor, for Senator or for Assemblyman, go before his party asking for its nomination, or go before the citizens asking for their votes on election day, until his position with respect to the repeal of the law has been definitely ascertained and put upon record in a form so distinct as to leave not the slightest doubt as to what he will do if he gets into office.

"Then let the press of New York move as a unit in defence of its priceless freedom, in vindication of its glorious traditions and in proof of its immeasurable power.

"This is the issue of 1891, so far as the newspapers of the Empire State are concerned. In comparison with the value of the principle so lightly and ignorantly assailed by the cranks who framed the electrical execution bill and the legislators who heedlessly assisted in enacting it, every question of partisanship or of personal preference becomes insignificant.

"For any office, from governor down, the *Sun* is prepared to support the man who comes out squarely for free speech and an unshackled newspaper press, as against the man who believes in the gag law, or who regards the question as of small importance. This applies to candidates for any executive or judicial post, for the Senate and for the Assembly. If the gag law candidate calls himself a Democrat, and the candidate who is for the repeal of the gag law is a Republican, a Prohibitionist, a Labor man or a Socialist, we are for the Republican, the Prohibitionist, the Labor man or the Socialist, every time, and we shall do what we can to elect him and to defeat the gag law Democrat. That is the *Sun's* position, and it will be the position of every self-respecting New York newspaper worthy to wear the proud badge of freedom and fit to exercise the rights guaranteed by the eighth section of Article I of the Constitution of New York and by the First Amendment of the Constitution of the United States."

These are brave words and true, and the ELECTRICAL REVIEW endorses every one of them. But we want more, we want the whole law repealed. As we have so often reiterated, electrical executions, which are at best uncertain, could never be successful until handled by the proper persons, that is, able electricians; and such men will never soil their hands and torture their consciences by assisting in any such Gerrycidal manœuvres as electrocutions. The sentiments of refined men, the voice of public opinion and the instincts of humanity, are all against torturing a fellow-being. Therefore, repeal the law which makes a latter-day Inquisition legal.

On this question we are wholly in sympathy with our daily contemporaries.

CORRESPONDENCE.

OUR BOSTON LETTER.

Dr. A. F. Mason, the general manager of the Simplex Electrical Company, this city, has fully recuperated his health.

Mr. Erastus U. Moore, secretary and treasurer of the Moore Electrical Mfg. Company, of New York, was in this city to-day.

The Aitham Motor Company has taken possession of a handsome suite of offices in the new Exchange Building, No. 53 State street.

Mr. F. E. Bisbee, manager Lewiston and Auburn Electric Light Company, of Auburn, Maine, was among the electrical visitors in town this week.

Mr. M. E. Clemons, of the Clemons Electrical Manufacturing Company, Attleboro, Mass., was among the prominent electrical arrivals in town during the week.

The Germania Electric Company, of this city, being the Eastern agents for the National Electric Manufacturing Company, of Eau Claire, Wisconsin, have sold a large number of the latter company's popular transformers in New England.

Consolidation. — The Thomson-Houston Electric Company report that the two local electric lighting companies at Olympia, State of Washington, have consolidated. The newly organized company has projected an electric railway in the town named.

The Interference Case against Messrs. Kimball & Wirt, patentees of the "K. & W." cut-out, submitted to the Commissioner of Patents early in July, by Mr. L. L. Dillon, of Attleboro, Mass., was decided recently in favor of the latter. The Clemons Electrical Manufacturing Company of Attleboro, Mass., will manufacture the "K. & W." cut-out for the trade.

Mr. L. W. Dillon has been appointed superintendent of the Attleboro, North Attleboro and Wrentham Electric Railway. This will not interfere with Mr. Dillon continuing as superintendent of the North Attleboro and Attleboro electric lighting system. The railway mentioned, although only a few months old, is already on a good paying basis, having an average daily patronage of 2,500 people. The aggregate number of passengers on Saturday and Sunday, August 1 and 2, was 8,000. W. I. B.

Boston, August 8.

OUR CHICAGO LETTER.

The Shaw Electric Crane Company have removed their works and offices from Detroit and are now settled in a commodious factory at Muskegon, Mich.

The Mosher Arc Lamp Company have just installed a number of their arc lamps for incandescent circuits in the handsome Midland Hotel, at Kansas City, Mo.

The Motor of special design built by the Thomson-Houston Company for use in turning heavy drawbridges has been put in place on the Rush street bridge in this city and is working admirably. Should this trial prove a success, and everything so far goes to show that it will be, it will in all probability be adopted by the city for all the bridges.

The Patton Motor, recently described and illustrated in this journal, continues to do everything desired of it. The car which is running on the experimental tracks at Pullman every day is drawing crowds to see it at all times. A great many intending purchasers of equipments have been among the visitors, and all unite in pronouncing it a wonderful success. Communications regarding it are received by the Patton Motor Manufacturing Company, 45 Lakeside building Chicago, in large numbers, many inquiries coming from foreign countries. The REVIEW of August 1 had an excellent cut and description of this new system.

Mr. H. M. Underwood, who up to within the past two weeks has acted as general Western agent of the Interior Conduit and Insulation Company, with headquarters in Chicago, has returned to New York, and will fill the position as general agent of the company. Since Mr. Underwood has been in charge of the Western office, the business of the company has taken a decided boom through this section of the West, notwithstanding the very hard road which he has been obliged to travel in order to bring the conduit and several appliances connected with the system before the proper person interested in building and the electrical companies at large. A representative of one of the leading electrical companies in Chicago says: "Mr. Underwood has held the Interior Conduit and Insulation Company's business entirely in his own hands in this section and too much credit cannot be given him for the way he has steadily climbed to the top of the ladder, for when he first started here in March last, he had every electric light, supply and construction company fighting hard against him, but those who fought the hardest deeply regret the change that has been made by calling so enterprising and pushing a young man to another section." Mr. Underwood has made a great many very warm personal and business acquaintances and we one and all tender him our best wishes. L. W. C.

Chicago, August 8.

The Neuhausen Aluminium Works.

[From a London Correspondent.]

Whilst the production of aluminium for commercial purposes is a subject which is almost daily receiving more attention at the hands of the engineering world, the Neuhausen works in Switzerland seem to be partly neglected. The information which has hitherto been published regarding this important establishment is exceedingly scanty; but as the writer has recently received direct from Neuhausen a detailed description of the plant there employed, the following particulars may be of interest.

The new works are situated at Laufen-Neuhausen, near the grand fall of the Rhine at Schaffhausen. Originally they were iron works, well known on account of the excellency of their products; and the establishment prospered for a long time, this being mainly due to the indefatigable energy of the proprietors, the Neher family. The extension of the railway system, however, opened new markets for foreign manufactures, which began to be more largely used in Switzerland, and this fact, combined with the difficulty of obtaining raw materials, darkened the prospects of the undertaking. After due consideration of the state of affairs, M. Naville-Neher, the principal of the well-known firm of Escher Wyss & Company, of Zürich, and M. George Neher, resolved to impart new life into the works by starting a new industry. These two gentlemen were the first to propose to utilize the waters of the Rhine in the production of aluminium, and they have formed the heart of the whole enterprise.

It was intended to obtain from the Rhine a total of 15,000 horse-power. Preparations were made to carry out the scheme, which, however, failed owing mainly to the outcry that the natural beauty of the river would be destroyed. It was, perhaps, as well that the project, as then elaborated, was not practically executed, and for reasons which it will be unnecessary to mention in this place. M. Naville-Neher did not, however, permit the aluminium problem to remain unsolved. At his instigation, M. Heroult, a young French metallurgist, entered into relation with the owners of the Laufen iron works and with the most important Swiss engineering firms, with a view to working on a large scale a process which had given good results on a small scale. The first trials made at the works were very successful, and the installation was gradually increased until, in August of 1888, the new Swiss Metallurgical Company had a plant of 300 horse-power in operation. Simultaneously with the experiments of M. Heroult at Neuhausen, Dr. Kiliani, of Berlin, put into practice in the name of the Allgemeine Elektricitäts Gesellschaft, of that city, a process of extracting aluminium direct from alumina by electrical means. The news of these experiments came under the notice of the directors of both companies, and it was considered advisable to amalgamate the two enterprises. This was soon concluded and in November, 1888, the Société Anonyme pour l'Industrie de l'Aluminium was constituted at Zürich, with a capital of $400,000. By this means, the directors in about a year were enabled to put into operation a unique installation of its kind.

According to the concessions granted by the State of Schaffhausen in February, 1889, the company has the right to draw from the Rhine, above the Falls, water power which is equivalent to 4,000 effective horse-power. The execution of the hydraulic works and the construction of the buildings were entrusted to Colonel Locher, the builder of the Pilatus Railway, and work according to his plans was commenced in the same month of that year. It was decided to arrange the plant so as to economize space as much as possible, and in order to effect this, a vertical disposition was chosen, that is to say, with the dynamos placed above the turbines and the armatures coupled to the vertical turbines. The old plant of the Swiss Metallurgical Company, with 300 horse-power at its disposal, occupied a length of 50 feet, whilst the new installations utilizes in about the same space 1,500 horse-power. Messrs. Escher, Wyss & Company, of Zurich, who were commissioned to instal the turbines, adopted the Jonval type, which fulfilled the conditions required. The supply of water is obtained above the Rhine Falls from a canal, 164 yards long, formed by a masonry dam in the river. In the center of this canal there has been built the turbine house of the Swiss Industrial Company; it contains a Jonval turbine of 400 horse-power and water is led to it by a vertical shaft. The water for the Société Anonyme pour l'Industrie de l'Aluminium is taken from the end of the canal by a conduit of pipes, constructed of riveted plates and 66 yards in length. This conduit has an internal diameter of eight feet four inches, and the water enters it through an iron rack, and it can be closed by a valve. The lower extremity of this conduit is connected at right angles by means of a strong conical tube, with the distribution conduit, which radiates into three tubes for the turbines. These comprise two large turbines, each built to yield 600 horse-power and driven at 225 revolutions; and one to give 300 horse-power and running at 350 revolutions.

The dynamos, which, as already stated, are arranged vertically over the turbines and coupled direct to the latter, are of the Brown type, and were built by the well-known Oerlikon Engineering Works. Two of these machines are each of 600 horse-power and are used in the production of aluminium; the third dynamo is of 300 horse-power and serves to excite the other two. From the two large machines the current is collected from the commutator in 24 places, and in each place by a group of five brushes two inches wide, there being, therefore, 120 brushes to each machine. The two large machines are constructed to yield normally 14,000 amperes at 30 volts, or 420,000 watts, in uninterrrupted work day and night, but this can be increased to 500,000 watts. The third machine gives 3,000 amperes at 65 volts, or 195,000 watts, and this output can be advanced to 250,000 watts. Thus, including the 300 horse-power machine of the Swiss Metallurgical Company, the Neuhausen works have at disposal 1,500,000 watts. There are in the works a foundry, forge, furnaces, hammers, repairing shops, etc. The process of producing aluminium as used in the Neuhausen works is tolerably well known. It consists essentially in the fusion of alumina and in its decomposition by the electric current, without the addition of any other conductor or flux whatever.

London, Eng., Aug. 1. A. W.

The Clam Bake.

THE AMERICAN ELECTRICAL WORKS ENTERTAINS ITS FRIENDS.

President Eugene F. Phillips, of the American Electrical Works, Providence, R. I., entertained his friends on Saturday, August 8, with a clam bake at the Vue de l'Eau Club, near Providence.

This was the thirteenth in the annual series of bakes, but that fated number cast no gloom over the assembled multitude of clam destroyers. Friday evening a jolly party of 25 left New York on the Sound steamer, arriving early Saturday morning. A large party came down from Boston on an early train and stragglers kept coming irregularly. When the feast was announced there were exactly 210 manly mouths watering for it.

At 11 o'clock a large number of the visitors swarmed in upon General Manager White, of the Providence Telephone Company, whose office was made a rendezvous. A steamer took the clammers down the shore to Silver Spring where the invading horde disembarked and marched in solid phalanxes upon the Vue de l'Eau Club house. Neglige costumes were the order of the day. Dignity was thrown to the winds. Gray-haired presidents and ambitious young electricians disported themselves joyously over the green sward, thumping each other with an inflated foot-ball and indulging in other such boyish pastimes.

A baseball game between the New Yorks and Bostons was progressing hilariously, when Umpire Stump discovered that some brainy bean-eater had been dallying with the score book. Umpire Stump then secured a large, fat club and a number of his friends and courageously declared the game 9 to 0 in favor of the New Yorks. Mr. Stump is resting quietly at this writing and hopes are entertained of his ultimate recovery.

The large punch bowl in the club house was generously patronized by the crowd, who all developed a wonderful thirst at the slightest provocation. While the people were playing baseball and football, initiating newcomers, ringing canes, shooting at a mark, taking a health-lift, etc., a number of sunburned, horny handed Rhode Islanders were preparing an altar of green wood and boulders, upon which the sacrifice of the festal day was to be offered up.

About three o'clock, shortly after a photograph of the crowd had been made, President Phillips led the way to a large tent, where the best clam bake in the world was served to hungry men. And this is what they had to eat:

MENU.

LUNCH

Raw Quahaugs Raw Oysters
Lobster Salad Fried Pork in Crumbs
Yankee Doughnuts Crackers and Cheese

DINNER

SOUP

Clam Chowder

FISH

Salmon and Peas Baked Blue Fish
Lyonnaise Potatoes
Frogs' Legs, Breaded Fried Eels
Clam Fritters Saratoga Chips

CLAM BAKE

Clams Quahaugs Oysters Lobsters
Sweet Potatoes Green Corn

RELISHES

Sliced Cucumbers Sliced Tomatoes
Bermuda Onions

BREAD

Pontin Rolls Brown Bread

DESSERT

Indian Pudding and Cream
Watermelon Black Coffee

Don't you wish you had been there? Each guest was given a very pretty pack of cards; on the back of one was the neatly printed menu.

After the feast speeches were made by President Phillips, Governor Ladd, Mayor Smith, A. J. DeCamp, Ralph W. Pope, Geo. M. Phelps, Mart Day, of the Providence *Journal*, and others. Mr. Thomas D. Lockwood acted as toastmaster, pleasantly introducing each speaker. With cheers and a tiger for President Eugene F. Phillips and Secretary W. H. Sawyer and the American Electrical Works, the crowd of happy clam eaters departed from the Vue de l'Eau Club about 6 P. M.

Among the gentlemen present were E. I. Garfield, D. A. Andrews, H. B. Cram, Fred. Gilbert, W. I. Barker, F. E. Pettingell, Frank Ridlon, C. E. Bibber, T. D. Lockwood, E. D. Floyd, A. D. Blodgett, Boston; Gen. C. H. Barney, W. J. Johnston, C. E. Stump, Geo. M. Phelps, W. T. Hunt, P. H. Alexander, Frank Harrington, Geo. S. Stonestreet, B. F. Hamilton, P. C. Ackerman, Stephen L. Coles, New York; A. J. DeCamp, Geo. F. Porter, H. B. Cutter, H. A. Cleverly, Philadelphia; Hon. F. P. Baker, Topeka, Kan.; M. E. Clemons, Attleboro; E. W. Clark, E. B. Baker, New Haven; Frank X. Cicott, Chicago; J. Carroll, Montreal.

Daniel W. Baker.

The City Hall flag is again at half-mast, to-day, this time because of the death of the eleventh ex-member of the Common Council who has died this year. McLaughlin, Dunn and Grant followed each other in rapid succession, and yesterday evening ex-Alderman Daniel W. Baker died suddenly of apoplexy. He was engaged in an assaying and refining business with his son, at the corner of Murray street and Railroad avenue, and resided at No. 57 South street. He was an old fireman, and once foreman of Hook and Ladder Company No. 1. He was also a manager of the Mount Pleasant Cemetery Company. In 1862 he was elected to represent the Ninth ward in the Board of Aldermen and successively re-elected until, in 1873, he retired to take the office of Comptroller, that department of the city government having been just created. He was Comptroller from 1873 to 1882, when Mr. Quinn succeeded him. He was 62 years of age, and a widow and three sons, Cyrus O., Daniel W. and Charles W., survive him. Of late years Mr. Baker had traveled widely, and at the time of his death he was contemplating a trip around the world with his wife, who always accompanied him abroad. He had visited the West and South repeatedly, and four years ago made an extended tour to Alaska, taking copious memoranda and photographic views of scenery, points of interest, etc. Two years ago he visited Russia, and on his return had a vast store of information. He also traveled through Norway and Sweden, and had studied human nature more or less in other climes and countries.—*Newark, N. J., Advertiser.*

Telephonic News

*** Three telegraph poles, two 50 feet and one 60 feet, were cut from the same tree at Harlan, Mich., a few days ago. The tree forked above the stump, which was four feet in diameter.

*** A gang of men will shortly begin work rebuilding the New England Telephone and Telegraph Company's line between Fitchburg and Worcester, Mass. A metallic circuit will be put in.

*** The Albany, N. Y., Telephone Company is gradually burying its wires. During the past two weeks 7,000 feet of conduits have been laid. Only a few poles will be in use when the new system shall be completed. A new building for the use of the company will be erected at the corner of Maiden Lane and Lodge street.

*** Manager Joseph Breeman, of the Youngstown, O., Telephone Exchange, recently said to a reporter that on several occasions recently persons have carried on conversations through his body. "I had occasion the other day to cut a wire," he said; "there were several persons desiring to use it, and I simply held an end in each hand and they held conversation through my body. The service, they said, was very satisfactory, and I suffered no inconvenience."

*** The executive committee of the Erie Telegraph and Telephone Company has recommended that the usual one per cent. quarterly dividend be declared payable August 17 to stockholders of record August 8. Report for the quarter ending June 30 shows for Cleveland Telephone Company, Northwestern Telephone Exchange Company and the Southwestern Telegraph and Telephone Company:

	1891.	1890.	Inc.	Dec.
Gross	$208,782	$189,392	$19,390	....
Expenses*	145,713	127,949	17,764	....
Balance	63,069	61,443	1,626	....
Dividends†	48,000	48,000	.....	....
Surplus	15,069	13,443	1,626	....
Subscribers added	163	417	.....	254
Total Subscribers	13,539	12,662	877	...

* Includes dividends on Bell Company's stock.
† Includes in 1891 $10,782 surplus of sub-companies, portion of which belongs to Bell Company, and in 1890, $9,843

A New Rosette.

The ceiling rosette illustrated on this page is manufactured and sold by the Hunt Engineering Company, 238 Washington street, Brooklyn, N. Y. It is made in different colors to match any wood-work, and is fire and water-proof. It is also made in porcelain

As will be noticed from the illustration, the construction of this rosette is very simple. There are but two parts and 10 screws in the whole device. The jaws for receiving the circuit wires are unusually wide, making the task of connecting the rosette into the circuit an easy one. This is but one of the many specialties handled by the Hunt Engineering Company.

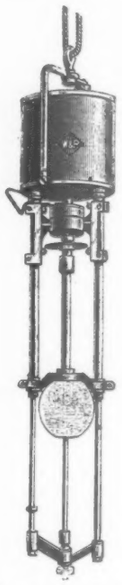
The Thomson European Electric Welding Company has granted the purchasers of the patents for Great Britain until September 1 to pay the balance of £30,000 cash due upon the contract. The company has already received some $320,000. It has also extended the German option until September 1. Trial machines have been sent to the south of Europe on which a royalty is received, and there is a prospect of selling the rights for Italy, Spain and France. The company has given a license for the use of the projectile patents all over Europe for a royalty on the welds made.

The orders received by the Thomson-Houston Electric Company during the month of July aggregated more than $300,000 per week, and were 25 per cent. in excess of orders received during the same period last year.

The Midget Arc Lamp.

The great economy of arc as compared with incandescent lighting renders interesting any attempt to popularize the use of small arc lamps.

For large shops or small lecture theatres something between the usual large arc and the ordinary incandescent lamp has long been wanted. It is absolutely necessary, not only that these small lamps should possess perfect steadiness, but also that they should be so simple in construction that they may be relied on for keeping in working order without constant skilled attention.



MIDGET ARC LAMP.

Such a lamp is called the "Midget" from its small size. It is made to give 250 candle-power, using five amperes at an electromotive force of 45 volts, so that even with this small size of lamp we obtain one candle-power of light for the expenditure of every watt of electrical energy used.

The illustration shows the general appearance of the lamp. The smallness of the globe prevents any depth of shadow, and minimises any complaint which may be urged against the inequality of the distribution of the light.

The principle upon which the lamp works may almost be called simplicity itself. The upper parts of the rods forming the frame of the lamp are hollow and in these the lower portions slide quite easily. The bottom carbon is attached to the lower part of the frame, which is fastened to the upper portions of the lamp by a chain passing up the hollow pillar forming the upper portion of the lamp, round a pulley wheel, whose motion is controlled by clockwork, and then to the upper carbon holder, which acts as a counterpoise and slides freely between the hollow pillars forming the frame of the lamp.

The motion of the pulley is controlled by clockwork, which is started and stopped by a pivoted bar, on whose under surface a number of teeth are situated. These engage a pointer attached to the pendulum of the clock. This bar is pivoted in the center and attached at each end to iron plungers, which move inside the cores of electro magnets, actuated respectively by the main and shunt circuits. When, owing to the distance between the carbon points, the resistance of the main circuit increases, and consequently the current through the shunt increases, the plunger is drawn further into the core round which the shunt circuit passes and the pendulum is released, the clockwork moves the carbons nearer together until the main circuit increases as much as to draw the other plunger into the core round which it passes and so overpowers the effect of the shunt circuit. The bar is drawn down, the teeth engage the pendulum of the clockwork and the carbons are maintained apart until, owing to the burning away, the same action is repeated. This action is so delicate that no inconvenience at all is caused by the intermittent feed; indeed, it is scarcely noticed.

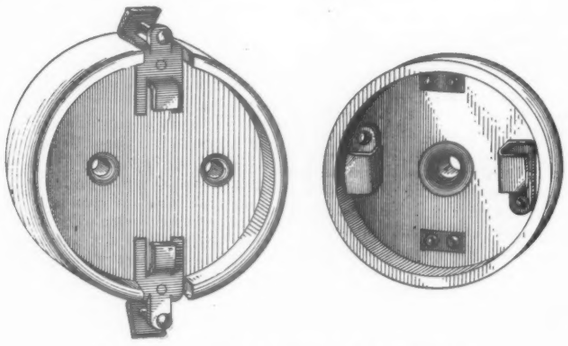
When the current is stopped the pendulum is released, owing to the action of a spring upon the bar, and the clockwork causes the carbons to remain together.

In the small box over the upper carbon holder the current before passing to the carbon magnetizes an iron core and lifts the upper carbon a small distance above the lower one and thus forming the arc when the current is first put on the lamp. The carbon is held up in this manner all the time the current is passing through the lamp.

The lamp is wound in three different ways —one suitable for parallel working, one for series and one for use with alternating currents. Those which are at present in use have given great satisfaction, and to meet the growing demand Messrs. Woodhouse & Rawson United, Limited, of 88 Queen Victoria street, London, have stocked a large quantity of them, from which they will be able to supply orders.

University Extension.

The new building for the mechanical and electrical engineering departments at the University of Vermont is now well toward completion, and September 1 will see it practically finished. The machinery will begin to arrive at about that time and enough will be in running order at the opening of the term, September 30, to begin shop work instruction. The equipment, including boiler, engine, machinery and tools, will be first-class throughout and will compare favorably with that of any similar institution in the country.



HUNT ENGINEERING COMPANY'S NEW ROSETTE.

Pennsylvania Pastimes.

The young ladies of Frankford, says the Philadelphia *Record*, have recently discovered that by holding a piece of tin against the iron foot-rests driven into the wooden poles of the Suburban Electric Light Company they receive a weak electric shock, and almost every evening a group gathers around the poles that are not situated on the main thoroughfares and enjoy the fun for hours. The sensation produced is said to be like that of placing the hand lightly on nettles. One pretty miss was heard to remark, after her first experience, "Oh, I thought I was squeezing a handful of pins." "Yes," said another, "it's something like being kissed by a young man with a bristly moustache."

Storage Battery Patents.

The Consolidated Electric Storage Company, New York and Philadelphia, exclusive licensees for the United States of the storage battery patents of Charles F. Brush, have issued a circular letter which is a good resumé of the question of storage battery patents. This circular says:

In order that you may understand the scope of those patents, we will describe in a few words what constitutes a storage battery as at present universally made.

Gaston Planté, whose storage battery was the first to attract public attention, used the following method: He employed two plates of lead, which he immersed in a solution of sulphuric acid and water; he then applied a current of electricity which had the effect of creating on the surface of the plates, by disintegration of its substance, a spongy substance, known as active matter or absorptive material, being spongy reduced metallic lead on one plate and peroxide of lead on the opposite plate. This process required several weeks and sometimes months of charging, involving too much labor and expense to make the Planté battery one of commercial value. Radical and fundamental improvements were needed to make the storage battery what it is to day. To Charles F. Brush, of Cleveland, Ohio, has been awarded, both by the United States Patent Office and the United States Circuit Court,* priority of invention of those improvements. Mr. Brush obtained the same technical results as Mr. Planté by applying the active matter to the plates mechanically before immersing them in the solution. He also made receptacles in the plates and mechanically filled those receptacles with lead oxides (active matter) by pressure. He then put the plates into the solution and subjected them to a charging current, by means of which he obtained in a few hours the results which Planté reached only in weeks or months of charging. The battery thus made had, moreover, much greater capacity than those of the Planté type. This method has, for obvious reasons, superseded that of Planté, and since Mr. Brush's invention (1879) all commercial storage batteries are made by applying the active matter mechanically to the plates. The plate, wall or support, to which the oxides are applied is known as the support plate or conducting support, and the oxides applied to the conducting support are generally called the active matter or absorptive substance. The solution in which the conducting support, with the absorptive substance applied thereto, is immersed, and which usually consists of sulphuric acid and water, is called the conducting liquid or electrolyte. Mr. Brush applied for patents for his inventions. He was put in interference with Camille A. Faure, who made similar claims to invention,† and after a long and bitter contest for a period of four years before the Patent Commissioners, Mr. Brush was awarded priority; and on March 2d, 1886, United States Patent 337,299 was issued to him. This patent covers broadly the mechanical application in any form (whether powder or paste) of the active matter or absorptive substance to a support plate. This is the decision of the United States Circuit Court in the case referred to. Any method of application by hand or machine is "mechanical." The court also decides that the words "active matter" and "absorptive substance," as used by Mr. Brush, are synonymous, and include not only lead oxides but every other substance that is absorptive (and it must be absorptive to be of any value), applied to a "conducting support." It does not matter what shape or size the conducting support may take, whether it be smooth, perforated, woven wire, flat, cylindrical, etc., so long as it is a "conducting support," it is an infringement of the above patent.

In addition to this broad invention, this patent also covers, expressly and by specific claims, the support coated with mechanically-applied metallic oxide, oxide of lead or equivalent lead compound and red lead; and also such a support when provided with "receptacles" filled with the mechanically-applied oxide of lead or other "active material."

The word "receptacles" was found by the court to include perforations extending through the plate.‡

This patent has nearly 13 years still to run and is controlled by this company. Another important patent now controlled by this company was sustained by the United States Circuit Court, viz.: Patent No. 266,099, covering a support with "cells," "cavities," "slots," or "perforations," and the words "cells or cavities" were held by the court to include perforations as well as cavities of other forms.§

* Electrical Accumulator Company *vs.* Julien Electric Company, 38 Fed. R., p. 117; and Brush Electric Company *vs. id.*, 41 *id.*, p. 679, and decree entered on this decision on June 10, 1890.
† Electrical Acc. Company *vs.* Julien Electric Company, 38 Fed. R., at p. 130; and Brush Electric Company *vs.* Julien Electric Company, 41 Fed. Rep., at p. 686.
‡ See last case at p. 690.
§ See last case at p. 692.

Patent No. 260,654, also controlled by this company, covers the application of the "absorptive substance" to the "conducting support" by "pressure," whether exerted by hand or a machine,

This company has also acquired United States Patent of Edmond Julien, No. 347,-300, covering an "inoxidizable" "conducting support." Experience has shown that the "conducting support" is so influenced by the electric current as at an early stage to oxidize and become disintegrated. Mr. Julien, who was one of the first inventors and workers in the field of storage battery, has discovered a certain alloy of lead and other metals, whereby this defect in the plain lead support is overcome. It is regarded as a most valuable invention. The patent has ten years to run.

To guard against imposition by persons who may pretend to have discovered a new battery, we wish to inform the reader that it is universally admitted that so far as scientific research has gone, only the metals and their salts (metallic oxides) may be employed to make a commercially useful storage battery, and only those metals and their salts may be employed which are practically insoluble in the electrolyte. The elements or electrodes of a commercially useful storage battery consist of two parts, first, a "support," and, second, an "active" or "absorptive" substance applied and secured to the support. Gold and platinum, but for their costliness, would be the most useful metals to employ for the support, as they are practically inoxidizable in the electrolyte or exciting fluid or solution of the battery. Of all the cheaper or base metals, lead possesses in the highest degree this immunity from attack by the exciting fluid or solution, and for this reason it has been chiefly employed where a simple metal has been used for the support plate.

The alloy of lead, antimony and mercury, patented to Edmond Julien, is, however, far superior to lead in this respect, and approaches more nearly than any other metal or alloy, the cost of which would permit its use, to gold and platinum.

Many attempts have been made to use various metallic compounds for the active or absorptive substance to be applied to the supports. These have been applied in various ways, but no commercial success has yet been reached by any experimenter in the use of any substance or by employing any method of application except reduced (or spongy) metallic lead and its oxides, mechanically-applied and secured to the support plate.

This company has also acquired United States Patents Nos. 388,757 and 408,986, of Henry G. Morris and Pedro G. Salom. Messrs. Morris & Salom have been engaged, for some years past, in devising suitable machinery for the effective and economical manufacture of storage batteries. These patents cover a machine known as the mechanical filler. Prior to the invention of this machine, the active matter was applied to the "conducting support" by hand. The method was laborious and expensive and the work generally uneven and unsatisfactory. The mechanical filler obviates all these difficulties. By its use each machine dispenses with the labor of from 30 to 40 men, and fills the plates uniformly and far more effectually than can be done by hand. It is the first and only machine of the kind that has ever, so far as we can learn, been invented or claimed to have been invented, and as it is both novel and highly useful, we deem the validity of the patents unquestioned. These patents have about 16 years to run.

We beg to call your attention to the fact that the Circuit Court of the United States for the Southern District of New York has, in the case of the Brush Electric Company *vs.* The Electrical Accumulator Company, decided on the 23d ult., affirmed its decision in the Brush Electric Company *vs.* The Julien Electric Company, sustaining the storage battery patents of Charles F. Brush.

The Patton Motor.

The working of the new Patton motor, illustrated in this journal last week, is entirely automatic. The engine once started requires no more attention until its day's work is done. Where the traffic is such as to demand a conductor, of course, a car would require a crew of two men, a motorneer being necessary with any system. The tank holding the gasoline is conveniently placed just under the roof of the car, feeding direct to the engine by gravity. The car has been running now for the past 21 days without a moment's hitch. It is always ready and has never refused to work when called upon. One day recently the car was run nine consecutive hours, consuming only six and a half gallons of gasoline. A person can easily form an idea of the cost of operation from this. The car, as shown in our recent illustration with all its machinery, has a seating capacity for 35 persons.

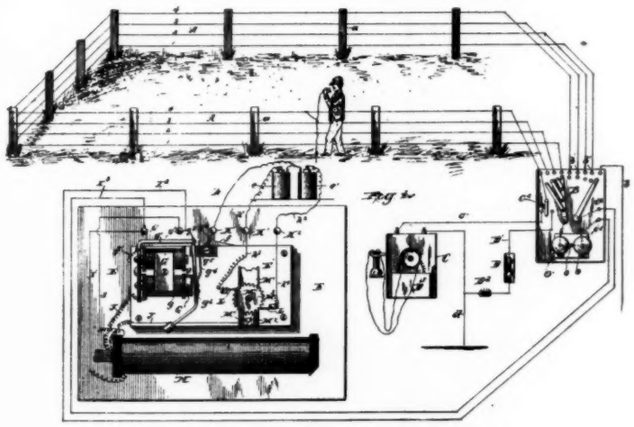
Wilson's Electric Fence Station Device.

The Patent Office has just granted to David H. Wilson, of Normal, Ill., a patent on the electric fence station device illustrated herewith. The invention relates to devices adapted to form a part of the necessary electrical appliances for generating and maintaining a constant current of electricity of the character and strength required in an electrical fence.

The object is to construct an electrical fence in which the electric current used for repelling animals is obtained from an induction coil and a primary battery, and with which when any of the wires forming the fence are grounded by an animal coming in contact therewith and with the ground, a shock similar in character and effect to the shock obtained when a magneto-electric generator is used shall be produced.

Another object is to obtain an induced current when any of the fence wires are grounded by an animal or by any other conductor with which a magneto-electric alarm bell placed in the circuit formed by such grounding shall be rung.

Besides this, it is desired to obtain a device of the character described wherein the wires forming the strands of the fence can be readily switched off from the induced current circuit (or partial circuit) and a telephonic or telegraphic instrument switched onto such wire or wires, to be used in the ordinary manner of using such instruments; that is to say, as a means of communication between a person located in the fence station and a person along the line of the fence.



WILSON'S ELECTRIC FENCE STATION DEVICE.

The illustration represents a plot of ground enclosed, or nearly so, by an electrical fence, a front elevation of the several devices forming elements of the fence and the electrical current generators.

The claims of the patent are as follows:

"1. In an electrical appliance for generating and maintaining an induced current of electricity, the combination of a primary battery, a circuit breaker, and an induction coil contained in the circuit of such primary battery, and a condenser, one of the wires connecting such condenser with such circuit extending from the circuit upon one side of the circuit breaker and the other of such wires extending therefrom from the other side of such circuit breaker, and secondary wires extending from the induction coil, one of such wires being grounded and the other thereof extending around the coils of a magneto-electric bell and to the fence wire, the hammer of such bell being adapted to move synchronously with the armature of the circuit breaker, substantially as described.

"2. In an electrical appliance for generating and maintaining an induced current of electricity, the combination of primary batteries, a circuit breaker, and an induction coil adapted to be contained in the circuit of either of such primary batteries, and a condenser, one of the wires connecting such condenser with such circuit extending from the circuit upon one side of the circuit breaker and the other of such wires extending therefrom from the other side of such circuit breaker, brushes each connected with one of the poles of one of the batteries and pressing against a rotatory wheel constructed of two parts, one of such parts being conducting and the other non-conducting material, whereby the primary circuit is alternately formed by one or the other of such primary batteries as an element therein, and secondary wires extending from the induction coil, one of such wires being grounded and the other thereof extending around the coils of a magneto-electric bell and to the fence wire, the hammer of such bell being adapted to move synchronously with the armature of such circuit breaker, substantially as described."

A Quiet Moment.

Bell telephone stock at 180, with its $18 cash dividends, nets the investor 10 per cent. besides a valuable right occasionally, and probably is as safe as many lower priced dividend payers, says the Boston *Post*. A good story is told in connection with what will happen when the Bell Telephone Company's patents expire, which relates to a man who had a theory that if all the people on this earth were to shout simultaneously, the inhabitants of the moon would hear it and shout back, and in that way a source of communication could be established between the moon and the earth. After all the arrangements had been perfected and the hour had arrived for the people to shout, so the story goes, everybody, instead of shouting, listened to hear the rest, and the result was that nobody shouted, and it was the quietest moment ever known on this earth. Such, very likely, will be the case when the Bell Telephone patents expire. Everybody will wait to see what someone else is going to do, and probably nothing at all will be done. It may happen that some city or town will get disgruntled and decide to have its own telephone plant, but it will be like a man going off into the backwoods to live because it would not cost so much as it would to live in a house in the city. A city or town, or even several of them, with isolated telephone plants, would very soon find out that it would be better to have telephonic connection with the outside world.

World's Fair Notes.

James Allison, of Cincinnati, has been chosen chief of the department of manufactures and Williard A. Smith chief of the department of transportation.

George Ward, manager of the Commercial Cable Company, writes to Chief Barrett that he will make a big display at the Exposition of cable instruments. He expects to show a complete repairing steamer, illustrating the method of repairing cables.

All of the important trunk lines in the United States have agreed to transport exhibits at half the usual rates. This reduction is made by the different traffic associations. It applies to every class of exhibits, except fancy horses, cattle and other high priced animals. The latest traffic association to grant the half rate is the Trans-continental, an association that embraces all lines West of the Mississippi River. Similar action has already been taken by the Western Traffic Association, the Central Traffic Association, Trunk Line and New England Association.

TELEGRAPHIC

.... The Western Union Telegraph Company is putting in a second line of wire from Los Angeles to San Diego, Cal.

.... At the annual meeting of the stockholders of the Bangor and Castine Telegraph Company, held at Bucksport, Me., Hon. N. T. Hill and E. B. Gardner, of Bucksport, G. H. Witherle and F. A. Hooke, of Castine, and A. W. Paine, Esq., of Bangor, were elected directors, with E. B. Gardner president and F. A. Hooke secretary and treasurer.

.... In the city of Leipsic, Germany, 34 firms have declared their intention of participating in the Columbian Exposition. At a meeting of the Cologne (Germany) Board of Trade, June 30, a resolution was adopted asking the Imperial Commissioner for the Columbian Exposition to get estimates from Chicago from responsible firms for showcases, etc., in order to enable exhibitors to figure more closely the probable expenses of exhibiting.

.... The annual meeting of the stockholders of the Pacific Postal Telegraph Company was held last week at the office of the company, No. 1 Broadway, New York. The vote for directors resulted in re-election of the old board. The directors are John W. Mackay, W. C. Van Horne, George Stephen, Charles R. Hosmer, Richard V. Dey, Albert B. Chandler, Edward C. Platt, George G. Ward and William H. Baker. John W. Mackay is the president of the company and W. C. Van Horne, the president of the Canadian Pacific, is the vice-president.

International Electrical Congress at Frankfort.

An international congress of electricians will be held at Frankfort, in the second week in September, under the presidency of Dr. von Stephan. The chair at the meetings will be taken by Dr. Werner von Siemens, and a committee, consisting of the directors of the Frankfort Electrical Company, Dr. Epstein, Prof. Krebs, Dr. May, Herr Lahmeyer and other well known engineers, has been appointed. A large number of English and foreign electricians have signified their intention of attending the Congress. Meetings, entertainments and excursions, extending from September 7 to 13, have been arranged.

Among the papers to be read will probably be the following: Professor Carhart, "On Replacing Batteries by Dynamos in Telegraphy"; Professor Dolbear, "Electrical Terminology"; Herr von Dobrowolsky, "The Transmission of Energy by Means of Alternating Currents"; Dr. Frölich, "The Production and Uses of Ozone"; Dr. Kohlrausch, "The Best Training for an Electrical Engineer"; Dr. May, "Lighting Regulations, from the Point of View of the Fire Insurance Companies." The papers and discussions are to be printed in book form and issued to the members shortly after the termination of the congress. Any further information can be obtained from the Frankfort Electrical Company.

The Schenectady, N. Y., Street Railway Company has decided to shortly issue trip tickets at three cents, available during certain hours in the morning and evening, to enable all working people to ride to and from their work on the electric cars.

The Thomson-Houston Electric Company reports its net shipments from the Boston office only for the second quarter of 1891 (May, June, July) as $2,261,606, against $1,798,467 for the corresponding period of last year, a gain of $463,139, or 26 per cent. There seems to be no depression in electric lighting and electric railway work.

* * The Racine, Wis., Street Railway Company has sold its lines to C. H. Holmes, of St. Louis, for $90,000. It is proposed to equip the road with electric power.

* * Ansonia's electric street car line has become so successful that the man who would now advocate horse power in Ansonia would be hooted out of town.—*Ansonia, Conn., Sentinel.*

* * The West End Street Railway Company, of Boston, has insured itself with insurance companies against every possible accident that it can be held liable for as a common carrier.

* * The Municipal Council of Paris, France, has voted in favor of the construction of underground railways in preference to elevated or viaduct structures as a means of rapid transit in that city.

* * While six years ago there wasn't an electric launch on the Thames, 16 were counted at the Henley regatta this year, and there are nine stations between Kingston and Oxford at which the storage batteries can be replenished.

* * The Tri-City Street Railway Company, of Davenport, Ia., is seeking to sell its large properties there and in Rock Island and Moline, Ill. The total investment is about two million dollars, and the company offers to dispose of it for less than this.

* * Dr. John Law, Col. R. E. Goodall and a syndicate of New York capitalists, will build an electric railway seven miles long between Leadville and Evergreen Lakes, Colo. Water power conveyed through eight miles of flumes will be used to run the power station.

* * The Worcester, Mass., Consolidated Street Railway Company has sued B. F. Boyden for five cents. He had a transfer ticket, but did not take the next car that came along, as the company's rules require, and refused to pay. The object of the suit is to test the validity of the regulation.

* * A director of the West End Street Railway Company tells the Boston *Traveller* that he is anticipating that the July statement of the road will make the best showing, by all odds, for a single month in the history of the road. The present daily increase over last year averages considerably more than $1,000 per day.

* * The report of the Hudson Electric Railway Company, of Albany, N. Y., for the year ending June 30, 1891, shows: Gross earnings, $11,737.84; operating expenses, $5,922.42; net earnings, $5,815.42; gross income, $5,815.42; interest on funded debt, $2,000; taxes, $58.68; net income, $3,756.74; cash on hand, $3,336.40; profit and loss (surplus), $3,756.74.

* * The Rochester, N. Y., Electric Railway Company has filed a report with the Railroad Commissioners at Albany, for the quarter ending June 30. It is as follows:

	1891.	1890.
Gross earnings	$12,893 01	$9,463 11
Operating expenses	8,531 76	5,394 33
Net earnings	$4,361 25	$4,068 78
Other income	$2,400 00	
Gross income	$6,761 25	$4,068 78
Deductions from income, as follows:		
Taxes	627 02	153 55
Net income	$6,134 23	$3,915 23

The general balance sheet shows as follows:

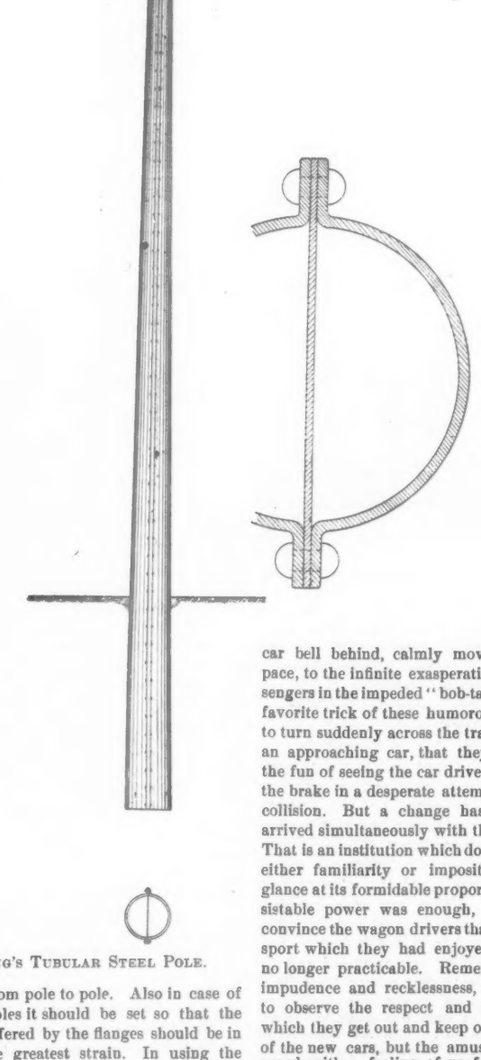
ASSETS.	
Cost of road and equipment	$203,491 09
Stocks and bonds of other companies	10,062 50
Due by companies and individuals	1,482 31
Cash on hand	50 00
Total	$215,085 90
LIABILITIES.	
Capital stock	$200,000 00
Due companies and individuals	876 40
Profit and loss (surplus)	14,209 50
Total	$215,085 90

Strong's Tubular Steel Pole.

We present in this issue a cut of a round steel electric railway pole which appears to fulfill the demands of railway construction. This pole is made of two tapering steel plates, pressed into pipe shape and securely riveted, with two flanges from top to bottom, being one continuous piece of steel, giving great strength. It is neat and ornamental.

The standard pole is 28 feet long, 7½ inches diameter at base and 4½ inches diameter at top, having a smooth taper the entire length. The pole may be used with greater advantage for a side pole than many other round poles now made. In using this pole for side construction it should be set with the flanges at right angles to the street, so as to get the full value of the stiffening offered by the flanges in the direct strain of the wire crossing from pole to pole. Also in case of pull-off poles it should be set so that the strength offered by the flanges should be in line of the greatest strain. In using the pole for center construction, the flanges are set parallel to the tracks, thus presenting a smooth round surface to the side of the car. The cross-arms for center poles are made either of standard gas pipe or of angle iron, with an ornamental cast-iron bracket, as shown, firmly bolted to the arms of the pole. On the top is a neat finished cap, with a place for an insulator in case one is needed for carrying a wire.

This pole is admitted by engineers to be not only neat and symmetrical, but of the best mechanical construction for a round pole. It is made by the Walton Architectural Iron Company, Cincinnati and Chicago.



STRONG'S TUBULAR STEEL POLE.

Electricity as a Remedial Agent.

There is nothing like electricity to knock out the habit wagon drivers have of whipping up and cutting in ahead of a street car. It was a trick that had been played in Buffalo with impunity for many years. But the other day a big trolley car came along and killed a horse, and it is likely that drivers in that city will hereafter be more cautious.—*Utica Herald.*

The introduction of the electric cars has wrought many beneficial changes, but none more salutary and, to the mind of the philosopher, more gratifying, than the marked effect upon the drivers of trucks and delivery wagons. In the days of the old and inoffensive horse car the drivers of wagons about town seemed to take malicious delight in driving upon the track at times when their presence was calculated to give the most annoyance, and with tongue in cheek and ears deaf to the expostulating sound of the car bell behind, calmly move at a snail's pace, to the infinite exasperation of the passengers in the impeded "bob-tail." Another favorite trick of these humorous Jehus was to turn suddenly across the track in front of an approaching car, that they might enjoy the fun of seeing the car driver wrestle with the brake in a desperate attempt to avoid a collision. But a change has come, and it arrived simultaneously with the electric car. That is an institution which does not tolerate either familiarity or imposition, and one glance at its formidable proportions and irresistable power was enough, evidently, to convince the wagon drivers that the innocent sport which they had enjoyed so long was no longer practicable. Remembering their impudence and recklessness, it is amusing to observe the respect and celerity with which they get out and keep out of the way of the new cars, but the amusement is tempered with a feeling of profound relief at the abatement of an unmitigated nuisance.—*Rochester, N. Y., Chronicle.*

After nearly two years of experiment and investigation, the Woodland Avenue and West Side Street Railroad Company, of Cleveland, O., have decided to abolish their horses and put in the electric motor system on all their lines. Although no decision has been reached, it is probable that the Short electric system will be used. A meeting of the stockholders will be held September 4. It is proposed to increase the capital stock $900,000.

Electrical Execution.

THE THEORY OF THE PRESENT METHOD PRONOUNCED ENTIRELY WRONG.

TO THE EDITOR OF ELECTRICAL REVIEW:

You are right. The process is a revolting and brutal one. If the object is torture—perhaps they think "hanging is too good"—then their aim is reached. It being a well-known fact that electricity always travels in the path showing the least resistance to its passage, is it not apparent that the course of the current, in the process used in electrocution cases thus far, was through the skin and flesh covering of the skull, and not through the skull, which, being bone and of much higher resistance, protected the objective point, the brain, thus necessitating a much longer contact and consequent slow roasting to death, instead of instant death by a paralyzing shock? Why not heed the advice of the master mind on electricity? Edison says pass the current from hand to hand across the heart, and I think he knows what he is talking about.

If the condemned must die by electricity, let him be killed by the first shock.

A large surface contact should be made over the palms of the hands and wrist, thus giving the current easy access to the main arteries, which are the best conductors. I believe this would produce instant paralysis of the heart, and cause less torture than by forcing the current through the channel of high resistance over the skin of the skull.

A comparative test for resistance can be made without difficulty, and for humanity's sake it should be done.

Yours, very truly,

FRED. CATLIN.

Brooklyn, Aug. 4, 1891.

PERSONAL.

Messrs. E. J. Hall, Jr., and William Dunlap Sargent, telephone magnates, are enjoying a brief respite at the Manhansett House, Shelter Island.

Mr. A. S. Vance and Mr. E. H. Harrison, able workers in the electrical field, and for two years past connected with the Edison General Electric Company, have resigned to join forces with H. Ward Leonard in his new company.

Mr. Henry J. Conant, who was for several years prominently identified with the Evans Friction Cone Company, of Boston, has recently associated himself with the New York office of Westinghouse, Church, Kerr & Company.

W. B. Ferguson, the street railway magnate, is interested in 15 or 16 street railways in New England and the South. During the last two years he has changed seven horse railways into electric railways. The firm of which he is a member is now engaged in constructing in Worcester, Mass., an electric railway extending out into the suburbs of Worcester some 13 miles.

Mr. Daniel W. Baker, of Newark, whose death we chronicled last week, was a great traveler and accomplished linguist, speaking several foreign languages quite fluently, particularly French, German and Spanish. For several years past, accompanied by his wife, he has been a regular visitor abroad, the large platinum business of his company being left in the competent hands of his eldest son, Mr. Cyrus O. Baker, Jr., who will continue it. Mr. Baker was also a thorough observer, constantly taking notes of scenes and incidents in the various countries visited, and afterwards writing them out for leading publications, but never permitting his name to appear as author. No citizen of Newark was more highly respected—his word was ever as good as his bond.

There is something amusing in the complaints entered by the New York *Times* against the Boston Street Railway. The trolley system, according to the *Times*, is destructive to the comfort and sightliness of the streets through which it passes. Isn't there a proverb about glass houses and stones, or are we thinking of a parable concerning motes and beams in the eye? It seems that until New York invents something more æsthetic and convenient than its own elevated roads, it would do well to stop criticizing other people's methods of going down town to business.—*Lowell Times.*

American Aluminium Dynamos.

To the Editor of Electrical Review:

Under the above heading, the London *Industries*, of July 24, 1891, publishes cuts and a description of the large dynamo built for the Willson Aluminium Company, of this city, recently illustrated in your paper. The editor of *Industries* has fallen into several errors which could have been avoided by a more careful reading of your paper of July 4 last, and by so doing would have saved his paper from publishing a criticism based on wrong premises.

Industries states: "The armature is wound for 50 volts and 15,000 amperes, and the cast iron frame must have a very high induction at 50 volts and 530 revolutions per minute." This statement is entirely wrong. The armature was wound for 100 volts at 530 revolutions per minute, and at that speed 7,500 amperes is only a very moderate load. This means a current density of only 2,500 amperes per square inch of armature conductor, and not 5,000, as stated by *Industries*.

Industries states: "The external bars are apparently one and a half inches broad, and there will thus be enormous waste of power in them where they leave the field. In addition to this, the cross-induction is so great that the field will be completely reversed under the trailing horns of the poles where the brushes come. Hence, the machine will spark."

The above paragraph is a good example of "a mere string of words without clear cut, definite meaning," and it would be well for *Industries* "to have mastered the old and orthodox explanation of ordinary electrical phenomena" before writing such utterly ridiculous and unmeaning sentences. If *Industries* meant to say that Foucault currents would be generated in the armature bars on account of their width, the meaning would have been clearer.

It is a fact that Foucault currents are generated in conductors passing through a magnetic field, and the amount of these Foucault currents is in proportion to the mass and distribution of conductors in the armature.

That it is not a serious matter in the case of this large dynamo so criticised by *Industries* is evident from the fact that this dynamo has an efficiency of conversion of over 95 per cent., and the machine runs absolutely without sparking.

For the benefit of *Industries*, I will state that machines do not spark on account of "the reversal of the field under the trailing horns of the poles," but on account of the generation of large quantity currents in the coils of armature conductor by short-circuiting of the coils as the commutator segments pass under the brushes, so that in machines, such as the Willson dynamo, where there is only one convolution of armature winding to a section of commutator, there is the minimum of sparking. As a matter of fact, these machines run without any sparking whatever at any load within the limits of the capacity of the machine.

Industries states: "The outer conductors seem to depend on friction driving, being held down by only one band in the middle of the armature." If *Industries* had examined its own cuts, this erroneous statement would not have been made. An examination of the cut shows six stud bolts for each bar, making a total of 288 bolts of one-half inch phosphor bronze to hold and drive the outer conductors, and the one band in the middle of the armature is only for the purpose of preventing the slight distortion of the conductors that might be caused by centrifugal force.

Industries also says: "If a heavy load is put on suddenly, we fear Mr. Willson's shaft will go round without taking the armature with it."

What slight grounds of "fear" *Industries* has will be apparent from the following data: The friction cones are 10 inches in diameter at the outer edge, with a taper of one inch to the foot, each being one foot long. As there is a constant spring pressure of six tons to press these cones together, it does not seem possible that these friction cones can ever slip from any power likely to be suddenly applied.

In conclusion, let me say, I am always glad of criticism, but I want criticism based on correct premises, and not upon such inaccurate statements as *Industries* has based its criticism.

Thomas L. Willson.

New York, August 7, 1891.

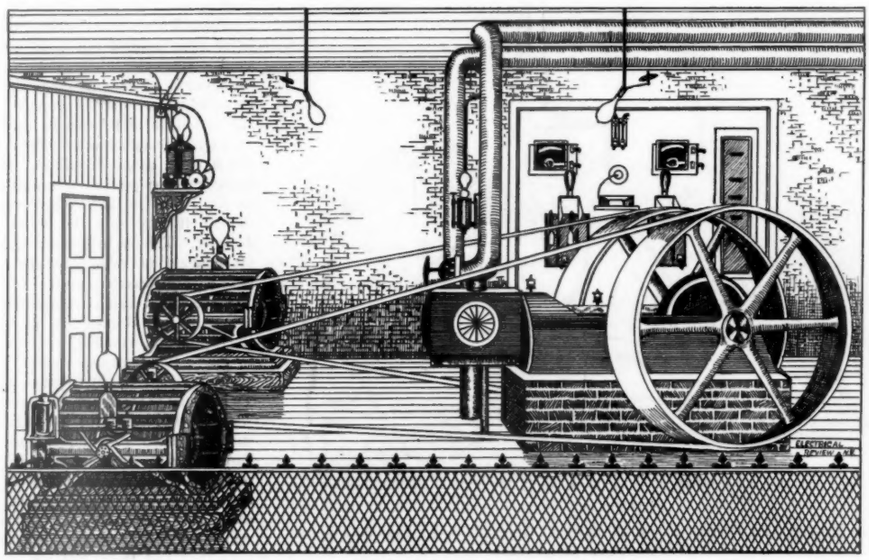
Early History of the Fusible Strip.

Here is an interesting little story about the fusible strip. Early in November, 1879, was a momentous time at Menlo Park, N. J. Mr. Edison had invited the New York Aldermen, a number of prominent officials and well known electricians, to be present at his laboratory to witness the trial of the incandescent light. He had invented his three-wire system and his carbon filament lamp, and was about to show the world what could be done with them. The party was invited to be present at night. On the morning of that day one of his faithful assistants remarked: "What will happen to us if somebody should lay a bar of metal across these wires?" "It would short-circuit the whole business, the lamps would burn out and the thing would be a fizzle." Mr. Edison pondered over the matter for a few minutes and saw the importance of the question. It was all the more important as it was known that some of the guests who were invited were not Mr. Edison's warmest friends. After thinking the matter over for a few minutes, Mr. Edison retired, and in an hour came back and ordered the wires cut in several places. These breaks were then connected by means of little strips of lead. The whole laboratory force was kept busy all that day casting these little strips of lead, so it will be seen that in the short space of an hour's time, after the emergency had presented itself and asserted its importance, Mr. Edison had produced what is to day one of the most valuable and vital devices in every electrical circuit. To finish the story, it may be said that when the evening came a now well known electrician was standing with one of Mr. Edison's assistants and said to him: "I think I will play a joke on Tom, and just lay this bar of copper across the circuit." The assistant replied: "You can't hurt anything by doing that." Nevertheless, the bar was laid across. Four lamps burned out, the balance kept right on at work, a man came and repaired the fuses and, much to the astonished electrician's surprise, everything went on as smoothly as before.

The Electric Light Plant in the Clarendon Hotel, Brooklyn.

It is only within recent months that Brooklyn, with its 900,000 inhabitants, could claim hotels and theatres of the first class. Now the city is rapidly acquiring metropolitan airs and possesses these public conveniences in many sections, and many new buildings are constantly being added. The new Clarendon Hotel, near the City Hall, is now the leading hotel in the city, and, of course, is fitted up with the modern conveniences that have come to us with the advent of that flexible and powerful element, the electric current. The building is lighted throughout with the electric light, a neat and well-arranged plant having been installed in the basement. At first this light was supplied from the street circuit, but the proprietors, Messrs. Frankel & Lansing, some time ago decided to put in a plant of their own, and the Thomson-Houston Company secured the contract. Two incandescent dynamos, with engine, were put in, furnishing a capacity of 500 lights. In addition the building is fitted up with Perrett motors, for the purpose of driving ventilation fans, etc. The Perrett motor, shown on the left of the picture we give of the dynamo room, controls the 100 candle-power flash light on the top of the building, which is made to flash every two seconds. By means of an electric signal, shown on the wall back of the engine, the quantity of water in the roof tank which supplies the hotel is constantly shown.

The view given in the engraving in this Review shows the engine, dynamos and motor, separated by a railing from the other departments of the hotel basement. The plant has been in very successful operation for about six months. Mr. Theo. Arnold is the engineer and Mr. Thos. Smith is his assistant.



Electric Light Plant in the Clarendon Hotel, Brooklyn.

Electric Light News

—— Goshen, Va., is now lighted by electricity.

—— The Hyde Park, Ill., Electric Light and Power Company filed a certificate of increase of capital stock from $100,000 to $500,000.

—— The United States Electric Lighting Company has filed papers in its appeal to the October term of the Court of Appeals in the Edison suit.

—— Massachusetts towns have been warned that they are required to purchase existing electric light plants when they accept the terms of the municipal lighting law.

—— The Manchester *Union* is pleased at the rapid adoption of electric lighting for streets by New Hampshire towns. It thinks it "is a marked sign of prosperity that does credit to the State."

—— Sheriff West, of Camden, N. J., last week sold out the Applegate Electric Floor Mat Alarm Company, under a number of executions aggregating several thousand dollars. Joseph E. Roberts purchased the stock and fixtures for $300.

—— The Lockport, N. Y., Street Railroad Company has sold its entire plant to the United States Railway Equipment and Construction Company, of New York. The new company will build an electric road. Work has already commenced.

—— The Excelsior Manufacturing Company, Leased, Washington, Ga., manufacturers of cotton seed products, will install a 500 light alternating incandescent and a 35 light alternating arc Westinghouse dynamo in their Washington, Ga., plant.

—— The Citizens' Gas Light Company, of Willimantic, Conn., have bought the property and franchise of the Willimantic Electric Light Company, and a contract has been signed whereby the property is to be transferred, and the gas company is to take possession on November 1, 1891.

—— Mr. Arthur S. Temple has resigned as manager of the Salem, Mass., Electric Light Company to assume the management of the Lamson Store Service Company, and Mr. S. Fred. Smith will retire from the Telephone Exchange management to take Mr. Temple's position as manager of the Electric Light Company.

—— The report that the Thomson-Houston Electric Company, of Boston, and the Ft. Wayne, Ind., Electric Company have purchased a large interest in the Municipal Electric Light Company, of St. Louis, is confirmed by Mr. James Campbell, a local broker, who has engineered several similar deals. The monetary consideration is not stated.

—— The Westinghouse Illuminating Company's plant at Schenectady, N.Y., has been sold to Samuel Insull, John Kruesi, W. E. Gilmore, William B. Turner and others connected with the Schenectady plant of the Edison Electric Company. The new company will furnish power for the electric railway, the city's arc lamps and house illuminating.

—— Word comes from Vienna that the electrical world is greatly excited over the discovery made by Capt. Franz Walter, the lecturer at the military academy, of a method of amalgamating glass with other metals besides platinum. This invention, if genuine, will revolutionize the manufacture of electric lamps, in which the use of platinum will be entirely discarded, thereby doing away with the principal source of expense. Captain Walter asserts that by his method lamps can be manufactured 50 per cent. cheaper than in the old manner, and that the breakage would not amount to five per cent.

LITERARY.

"Transactions of the American Institute of Electrical Engineers," for June and July have been received.

Columbia College School of Mines circular of information has been received. The course in electrical engineering is well laid out.

"Studies from the Kindergarten" is the latest of the educational monographs published by the New York College for the training of teachers.

We have received the adverse report presented to the House of Representatives by Mr. Wickham, of the Committee on Coinage, Weights and Measures, on "the Coinage of Gold and Silver."

"Test of a Triple Expansion Engine," read by John T. Henthorn before the recent meeting of the American Society of Mechanical Engineers, at Providence, R. I., has been received from the E. P. Allis Company, Milwaukee.

The *American Manufacturer and Iron World*, of Pittsburgh, has appeared in a new form. The old style blanket sheet has been dropped and a form 9¼ by 12½ inches in size has been adopted. This and other improvements are very acceptable.

T. R. Sullivan (whose short stories have so often appeared in *Scribner's*) will have in the August (Fiction) number a story of Venice entitled "The Anatomist of the Heart," with illustrations by the well-known French illustrator, Albert Lynch.

The Hon. Charles A. Dana, editor of the *Sun*, has written for the August number of the *North American Review* an article of extraordinary interest under the head of "The War—an Unpublished Chapter." It describes the extraordinary experiences of a spy during the Civil War.

The initial article in the August *New England Magazine* is the "State of Vermont," by Col. Albert Clarke. It is a brief but comprehensive account of the growth and development of the State since pre-revolutionary days, and is both interesting and instructive. The article is embellished with many fine illustrations.

Scribner's Magazine for August is a "Fiction Number," and contains five complete short stories by Thomas Nelson Page, T. R. Sullivan, A. A. Hayes, Annie Eliot, and John J. a'Becket. Four of the stories are illustrated, each by an artist chosen for his skill in delineating the special characters and incidents which are the features of the tale.

Funk & Wagnalls, of this city, are making rapid progress in the preparation of their "Standard" dictionary of the English language; advance pages at hand presage that this will doubtless be the leading single volume dictionary of our day. A staff of 100 editors is at work on the book. Among them we notice the names of Prof. Alexander Graham Bell and Robert Grimshaw.

"The Press as a News Gatherer" is the subject of a paper in the August *Century*, by William Henry Smith, manager of the Associated Press, and is the first of several separate papers on journalism which are to appear in the *Century*. Mr. Smith prints some novel evidence that the British government, in the earlier years of the century, was accustomed systematically to suborn the press. He traces the origin and growth of the Associated Press, and discusses topics of special interest to newspaper editors, as well as to the public.

Poultney Bigelow, who was a schoolmate of the German Emperor, will contribute an article to the Midsummer (August) number of the *Century* on the first three years of the Emperor's reign—the third anniversary of his ascent to the throne having taken place on the 15th of June. Mr. Bigelow believes that "since Frederick the Great, no king of Prussia has understood his business like this emperor," and in this article he gives what he considers the secret of the power of William II with his people, and incidentally contributes many facts regarding his life.

Just before her bereavement, Lady Macdonald, widow of the late Sir John Macdonald, completed her first ambitious literary effort in a series of articles for the *Ladies' Home Journal*, the first one of which will appear in the August number of that periodical. Last Summer Lady Macdonald, with a party of friends, traveled in her private car through the most picturesque parts of Canada, and in a delightfully fresh manner she describes her experiences on this trip in these articles, to which she has given the title of "An Unconventional Holiday." A series of beautiful illustrations, furnished by Lady Macdonald, will accompany the articles.

One of the two articles in the August number of *The North American Review*, to which special attention is called by the typographical arrangement of the table of contents, is entitled, "The War—Some Unpublished History." The author is the Hon. Charles A. Dana, the brilliant editor of the New York *Sun*, who was Assistant Secretary of War in 1863–4. It is truly a romance of the war which he tells in a few pages, and one of thrilling interest, illustrating for the thousandth time the force of the adage that truth is stranger than fiction. Of the hero of his tale, a Union spy, Mr. Dana says: "He was one of the cleverest creatures I ever saw. His style of patriotic lying was sublime; it amounted to genius." The number opens with a scholarly and lucid article from the pen of Professor Goldwin Smith, "New Light on the Jewish Question."

NEW ELECTRICAL BOOKS.

The sixth edition of Salomon's "Electric Light Installations and Management of Accumulators" is now ready. It is very much increased in size over the previous editions and thoroughly revised. The price has been advanced to $2.

"Telephones, their Construction and Fitting," by F. C. Allsop. A practical treatise on the fitting up and maintenance of telephones and the auxiliary apparatus. Price, $2.

"Telegraphy," by Preece & Sivewright. Ninth edition, revised and enlarged. Illustrated; 336 pages; cloth binding; $2.

"Electricity and its Recent Applications," by Edward Trevert. A practical treatise for students and amateurs, with an illustrated dictionary of electrical terms and phrases; 175 illustrations; cloth binding; $2.

"Dynamo Construction," by J. W. Urquhart. A practical hand-book for the use of engineer constructors and electricians in charge, embracing framework building, field magnet and armature winding and grouping, compounding, etc., with examples of leading English, American and Continental dynamos and motors, with numerous illustrations. Cloth binding, $2.50.

Staten Island's Big Electric Light Station Burned.

The electric light plant of the Richmond County Light, Heat and Power Company, at St. George, S. I., was burned the night of August 3. The plant is practically owned by Erastus Wiman, whose son, W. Dwight Wiman, is general manager of the company.

The loss will amount to about $100,000, fully covered by insurance in the Electric Mutual and other companies.

The fire started shortly after 8.30 o'clock in the boiler room. It was discovered by a fireman before the flames had gained much headway, and all of the employés at the plant, which was then in full operation, were quickly on hand to fight the fire. But when the company's hose had been laid it was found that the water had been cut off from the Staten Island Water Supply Company's pipes and they were useless.

An alarm was given, and in a short time eight fire companies were on the scene. It was some time after the arrival of the firemen before an effective stream of water was to be had, and they were compelled to stand by and see the flames spread through the entire plant.

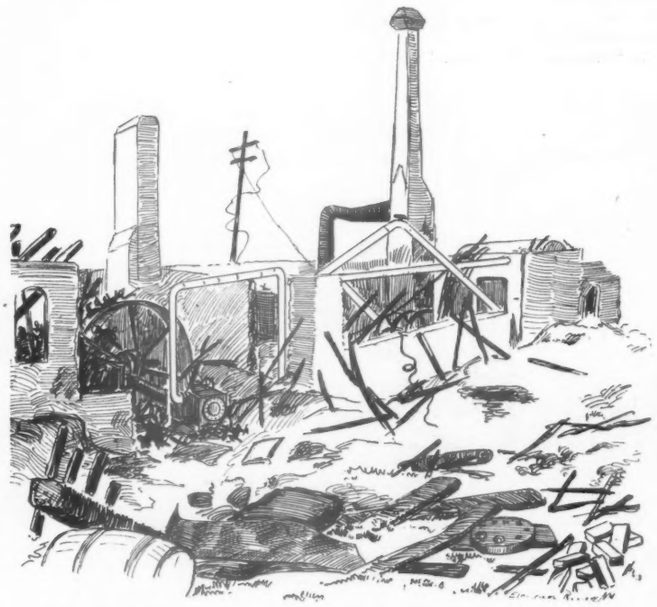


FIG. 1.—ENGINE AND BOILER ROOM OF THE ST. GEORGE, S. I., ELECTRIC LIGHT STATION AFTER THE FIRE.

In the meantime, the employés at the station had shut down the engines, banked the fires under the boilers and thrown the safety valves wide open. Every one feared an explosion of the boilers, but fortunately the main steampipe burst without serious damage and the danger was averted.

It was not until after 10 o'clock that the firemen got control of the flames, and midnight before the fire was out. All of the plant was in ruins, except a portion of the office. The buildings were of one story, brick, 60 by 50 feet. The boiler room was separate from the dynamo room, and contained two 300, one 100 and three 80 horse-power boilers. Two 1,600 horse-power Corliss engines supplied the power for the Thomson-Houston, American and Westinghouse dynamos. The company supplied 350 arc and 600 incandescent lamps and lighted the streets and business places all along the east and north shores, from South Beach to Mariner's Harbor, covering a territory about 36 square miles in area. These are now left without lights in their streets. South Beachers must resort to kerosene and it will be some weeks before lights can be supplied. New Brighton renewed its contract with the company last week, and the trustees of West Brighton had just voted to renew the contract as the fire broke out.

Mr. Wiman said that the company would begin at once to rebuild the plant, but in a new location along the shore. They had been contemplating this move for some time and the fire would result in hastening the building of the new plant.

An insufficient force of firemen was probably the cause of the total loss of the plant.

Recently the board of trustees of New Brighton forbade the Edgewater fire companies to enter the former town, under penalty of a $50 fine, and this regulation prevented the forces at the fire from being doubled. The flames had almost full swing, and made a blaze that filled uptown New Yorkers with fears for the lower part of the city.

Ancient and Modern Inventions.

We speak of the art of printing as modern. But the Romans used movable types to mark their pottery and indorse their books. Mr. Layard found in Nineveh a magnificent lens of rock crystal, which Sir D. Brewster considers a true optical lens and the origin of the microscope. The principle of the stereoscope, invented by Professor Wheating, was known to Euclid, described by Galen, 1,500 years ago and more fully in 1599, A. D., in the works of Baptista Porta. The Thames tunnel at London, and later that at Chicago, were anticipated by one under the Euphrates at Babylon, and the Egyptians had a Suez canal thousands of years before the present waterway was built. Such examples might be indefinitely multiplied; but turning to photography, M. Jobard, in his "Neuvelles Inventions aux Expositions Universelles," 1556, says a translation from German was discovered in Russia, 300 years old, which contains the clear explanation of photography. The old alchemists understood the properties of chloride of silver in relation to light, and its photographic action is explained by Fabricius in "De Rubus Metallicis," 1566. The daguerreotype process was anticipated by De La Roche in his "Giphantie," 1760, though it was only the statement of a dreamer. The use of cork for making jackets as an aid in swimming, and now familiar to ocean travelers in the so-called life preservers with which steamers are equipped, is very old. A Roman sent by Camillus to the capital and who had to swim the Tiber to evade the besieging Gauls, wore cork under his attire in order that he might float. The pyramids of Egypt and the foundation walls of the temple of Jerusalem contain stones of such size and weight that it is hardly possible for them to have been put in place without mechanical power equal to any now known. Was it steam that supplied this power, or was it some device which has now become "a lost art?" Perhaps they had their Edisons, their Watts and their Stephensons in those days, who, like the builders of the tabernacle in the wilderness, were cunning workmen, equal to any emergency, but who, when the need of their services no longer existed, dropped back into modest obscurity. It may be, also, that the patent system of the ancients did not encourage the development of inventive genius. Now, when a man invents a really useful article his fame and fortune are fairly well assured. It was not so then. A Roman architect discovered the means of altering the nature of glass and making it malleable. He produced all the malleable glass which Emperor Tiberius desired, and then, to prevent the secret becoming known, the monarch cut off the inventor's head. So late as the reign of Louis XIII a similar discovery was made. But Cardinal Richelieu was afraid that it would injure the French glass manufacturers, of whose profits, after the style of government "paternalism" then in vogue, the prime minister probably had a liberal share; so the man with a too-inquiring mind was put in prison and there remained all his life. That sort of thing was not calculated to send men on exploring expeditions into the "dim unknown," and Edison and his guild, had they lived then, would hardly have found a profitable field for their inventive talents.—*Troy Daily Times.*

The Vincennes, Ind., council has given the street railway company a charter for 40 years. Contracts have been let for a Westinghouse electric plant.

The Moebius Electrolytic Parting Process at Pinos Altos.

BY GEORGE W. MAYNARD.

During a late trip into Western Chihuahua I took occasion to visit the mines and works of the Pinos Altos Company, an English organization, which has been carrying on successful work for the past ten years. The manager, Mr. Waithman, very courteously supplied me with information as to its workings. That portion of the plant which has for its object the parting of gold and silver is of sufficient interest, I hope, to justify my giving an account of it in considerable detail. The system which has been adopted, and which is being carried out so successfully, is that of Mr. Bernard Moebius. It had not, however, been my good fortune to see a plant of this kind until visiting Pinos Altos. Preliminary to the description of the process, however, it may be well to state that the Pinos Altos Company has a Frazer & Chalmers 55 stamp mill, which is actuated by a 300 horse-power compound Corliss engine.

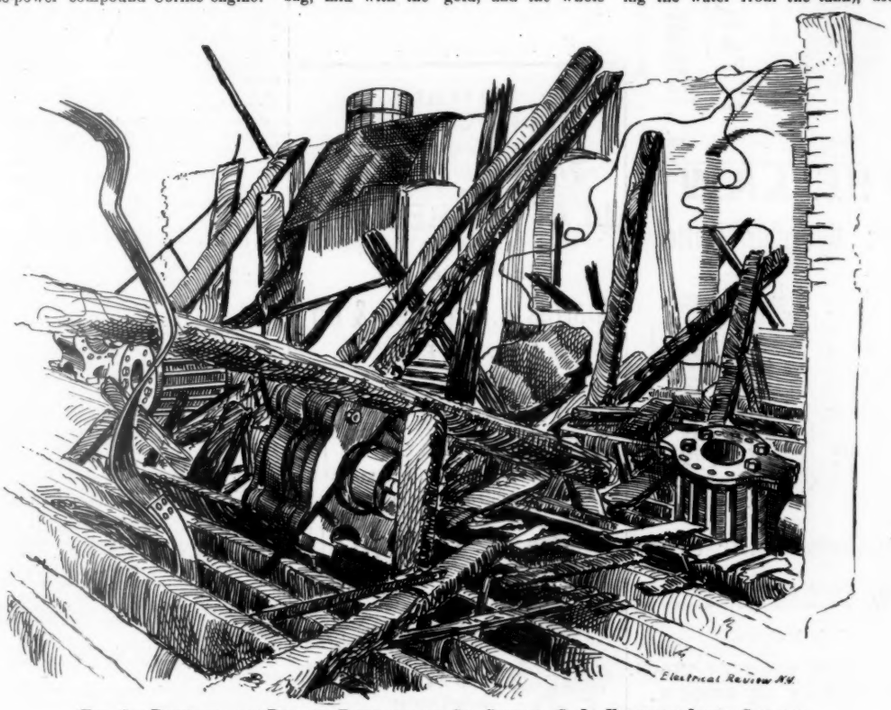


FIG. 2.—RUINS OF THE DYNAMO ROOM OF THE ST. GEORGE, S. I., ELECTRIC LIGHT STATION.

The plant for carrying out the Moebius electrolytic parting process at Pinos Altos has a capacity of 3,500 to 4,000 ounces of doré silver in 24 hours, and consists of a tank 12 feet in length, 2 feet wide and 20 inches in depth, divided into seven compartments, technically known as cells. The cells are lined with rubber packing so that all leakage is prevented. Four pure silver sheets are placed in each cell as cathodes and six doré bullion plates as anodes, which are so placed that anodes face both sides of a cathode. A bag stretched over a frame of wood covered with hard rubber, surrounds each pair of anodes. Underneath the electrodes at the bottom of the cell there is placed a tray, which has a perforated bottom, covered with asbestos cloth and hinged to the tray on one side and kept in position on the other by movable pins. Automatic brushes or scrapers are constantly moving along the electrodes. The success of the process is largely due to this brushing device. By means of a hoisting arrangement above the battery the electrodes, frames, bags, trays and scrapers are lifted, so that the exciting liquid alone remains in the cells. The object of this arrangement is to facilitate the quick cleaning of the battery and the removal of the silver and gold precipitates.

The process is carried on as follows: The doré bullion, which varies in fineness from .800 to .900 in silver and 25 to 50 in gold, is cast into thin plates. The plates are hung in the cell and subjected to the action of a current of small electromotive force. The exciting liquid consists mainly of a solution of nitrate of copper and nitrate of silver acidulated with nitric acid. The solution may be formed in the battery if the process is started with a very dilute (one per cent.) nitric acid and adding more acid by degrees, as the copper content of the bullion may require it. The silver passes into solution from the anodes, and is precipitated as heavy needle and tree-like crystals at the cathodes. These crystals would rapidly grow over the anodes if they were not continuously scraped off and allowed to drop into the tray beneath. The dissolving and precipitation go on without intermission as the acid liberated by the deposition of the metallic silver goes back to the anode and again dissolves an equivalent amount of silver. If the cathode were allowed to become completely covered the dissolving action of the current would soon cease, because the electrodes would be short circuited, silver would drop into the anode bag, mix with the gold, and the whole operation would cease. By reason of the scrapers the electrodes can be brought very near to each other, whereby the resistance of the cell is considerably diminished and a smaller amount of electrode surface is required, thus effecting a great saving of metal, which would otherwise be locked up in the anodes. Another advantage of the brush arrangement is that it prevents polarization in the cell and consequent waste of power. By agitating the exciting liquid, the bad effects resulting from the formation of layers of different specific gravity are avoided.

The copper from the anodes is also dissolved, but as it is less electro-negative it remains in solution, provided the exciting liquid is sufficiently acidulated or carries a sufficient amount of nitrate of silver.

All the lead (as peroxide), the platinum metals, antimony and other impurities, remain with the gold in the bag surrounding the anodes. In the course of time the exciting liquid becomes too concentrated in copper and needs to be regenerated in order to get back the nitric acid and to obtain the copper contained in the bullion. The regeneration can be effected by the electric current and the use of carbon anodes and copper cathodes, but at Pinos Altos the old solutions are used to great advantage in the amalgamating pans in the place of bluestone.

It is evident that if the doré bullion were free from copper, no acid would be consumed, as the exciting liquid would not be contaminated and, therefore, would not have to be regenerated or replaced. In Mexico there is no necessity for producing .999 fine silver, because the mints accept for coinage without refining charges all bullion over .900 fine, where the alloyage is copper.

The manual labor connected with the process is very light. At Pinos Altos the assayer and his helper perform the duties. Every 24 hours the separated silver and gold is removed from the battery. This is done by turning a crank, by means of which the electrodes, conductors, the tray containing the silver precipitate and the bag frame containing the gold, are raised up, leaving only the exciting liquid in the cells.

A movable tank on castors, provided with a false or filtering bottom and a chute extending under the silver trays, is pushed alongside the battery. By removing the pins holding the bottom of the trays, the silver precipitate drops on the chute and into the tank. After a superficial washing, the silver is ready to be dried and melted into bars of .999 to 1.000 fine.

The bag frames containing the gold are also removed and turned into a tank filled with water, which is also provided with a false bottom. The gold is filtered (by drawing the water from the tank), dried and melted, whereby the lead and other impurities go into the slag.

It will thus be seen that all the operations are very simple, and that skilled labor is uncalled for. The process is a very clean one. There are no fumes and noxious gases, no handling and transferring of solutions, no bye-products, and, therefore, no chance for loss of precious metals. As there is only a nominal expenditure of acid or other chemicals the process may be readily carried on wherever power can be obtained.

The electric current employed is 170 amperes and about eight volts, which corresponds to an expenditure of only two and a half horse-power for parting 3,500 to 4,000 ounces per day. Since the adoption of the Moebius process the gold alone is shipped to England, the silver being turned into the Chihuahua mint. Not only is all the gold saved by this process but there is also a saving in time, exchange, expressage and export duties, and, above all, the cost of parting is less than by any other known process.

There is a popular notion that a large amount of capital must necessarily be locked up in the anodes, solutions, etc. The result of my inquiry on this subject is that the doré silver is cast into anode plates 10 inches long and eight inches wide, and from three-sixteenths to one-quarter inch in thickness; the plates weigh on the average about 100 ounces. In each of the seven compartments there is room for six plates, therefore, it takes 42 plates or about 4,200 ounces of bullion to fill the apparatus at the start, which, as already stated, has a parting capacity of 3,500 to 4,000 ounces per 24 hours.

In the course of time and when the process is in continuous operation and the anode plates have become more or less decomposed, the actual amount of metal locked up in the anodes is much less than 4,200 ounces. The exciting liquid or stock solution contains variable quantities of silver but not to exceed 300 ounces. The cathodes, which are made of pure silver, represent an intrinsic value of about $1,000, and should be counted in with the original cost of the plant.

The silver and gold precipitates are removed from the apparatus every 24 hours, and may be immediately melted into bars, so that there is no locking up of metals here for future operations. It will be seen from the above that at no time is there more than twice the daily capacity locked up in the plant; in other words, the doré silver can be parted within two days. At Pinos Altos there is a general clean-up every month in mill and parting department, and in the latter only about 1,500 ounces of silver are retained in the stock solution and anode scraps, which are worked up in the following month's parting.

I am informed that the original cost of the Pinos Altos plant was $6,000, including $1,000 worth of pure silver sheets for electrodes; this was under a guarantee that the cost of parting should not exceed one-third of a cent per gross ounce of bullion. The royalty charge is one-third of a cent per ounce. The contracting party had to furnish everything, with the exception of the steam connections and room 25x25 feet. Considering the heavy expenses for freight, including several weeks of mule-back transport custom duties, the traveling and living expenses of the constructing engineer and his assistants, it is evident that the first cost of the plant must have been very moderate.

In the United States the process has been in successful operation at the works of the Pennsylvania Lead Company, at Pittsburgh, since September, 1886, where 30,000 to 40,000 ounces of doré bullion are parted daily. The first plant was erected at the works of the Kansas City Smelting and Refining Company. I am informed that the St. Louis Smelting and Refining Company has lately contracted for a plant of a capacity of 35,000 to 40,000 ounces a day.—*Engineering and Mining Journal.*

H. Ward Leonard & Company.

Mr. H. Ward Leonard, who has just requested the Edison General Electric Company to accept his resignation as general manager of the intelligence department, to take effect September 1, announces the formation of a new corporation, under the title of H. Ward Leonard & Company, whose principal office will be in New York city. The business will be that of electrical engineering generally, with special attention paid to electrical motor appliances, the transmission of power, the installation of central station lighting and power plants, the concealed wiring of large office buildings, hotels, etc., and plants in which advantages can be obtained by a combination of apparatus of various companies, such as alternating current systems, storage batteries, arc lights, etc.

A feature of the business of this concern, which is entirely novel, will be the supplying of expert information regarding engineering matters, the operation of different plants and upon the best methods and system of accounts in connection with the operation of electrical plants. Such information will be supplied by correspondence at a very moderate charge per annum. This company will be actively in business before September 1. Their offices will probably be in the Columbia building, No. 29 Broadway, New York city.

Mr. Leonard is an electrical engineer of undoubted ability. He is a college bred man, having received the degree of B. S., from the Massachusetts Institute of Technology, where he completed the very thorough course in electrical engineering which that college affords. Mr. Leonard will also be remembered as the senior partner in the firm of Leonard & Izard, Chicago, who for several years held an important agency of the Edison Company. Two years ago Mr. Leonard was called to New York to assume an important position with the United Edison Company. When the Edison General Electric Company was organized, Mr. Leonard was made general manager of the intelligence department. Here he acquired a large experience in the handling of important statistics of the electrical industries—an experience of especial value to the new company which he has organized.

Mr. Leonard is a native of Cincinnati and possesses all the better qualities of the energetic Western business man. To him and to his associates the ELECTRICAL REVIEW extends best wishes for success in their new venture. We can assure our friends that any business which they may do with H. Ward Leonard & Company will be thoroughly and satisfactorily done.

KINDRED INTERESTS

The Electrical Supply Company, Chicago, have sent out some very handsome printed matter relating to the Stanley transformers for which they are sole Western agents.

Western Electric Construction Company.—On September 10, the offices of this company will be removed from 503 Delaware street to 125 West Sixth street, Kansas City, Mo.

The Western Electric Company, Chicago, New York, London, Berlin, Antwerp and Paris, has just sent out a beautiful catalogue which includes everything electrical, from "acoustic magnetos" to "wrenches, splicing."

The Interior Conduit and Insulation Company, New York, have just issued a new catalogue of interior conduits and special electric light, heat and power appliances. It is a tasteful and well arranged catalogue, and makes a comprehensive showing of this very complete system.

Milliken Brothers, 55 Liberty street, New York, have issued a handsomely illustrated catalogue showing the advantages of their "Phœnix" column construction for buildings. This most modern method of construction is well adapted for electric light stations and electric railway power houses and car barns.

E. T. Orne, 112 Randolph street, Chicago, is placing his system of electric speaking tubes in the new daily *Herald* building of that city. The work will also require a hundred or more Partrick & Carter Company's new King annunciators, which Mr. Orne found were best adapted for use in connection with his system.

The Eddy Electric Company, Windsor, Conn., have a large contract on their hands. They are to supply the American Encaustic Tiling Company's factory, at Zanesville, Ohio, with electric machinery which will require 365 horse-power. The Philadelphia mint has installed an Eddy electric motor of 25 horse-power, which is run by current from the street.

The Consolidated Electric Storage Company, New York and Philadelphia, announce that: "Preliminary injunctions will be promptly applied for against infringers. Special types, suitable for any system of traction, will be furnished when ordered in large quantities. Our phonograph and medical types are standard and can be furnished on short notice."

Clark Electric Company.—At the fourth annual exhibition of the Amateur Photographers' Society, of New York, held in May, 1891, the Clark Electric Company was awarded a silver medal for excellence of its arc lamp for electric optical lantern apparatus. This is the first and highest medal ever issued by this society for electric light for optical purposes in photography.

Reduced Rates via B. & O. R. R. to Telegraphers' Meeting.

For the meeting of the Old-Time and Military Telegraphers, at Washington, August 19 and 20, the B. & O. R. R. will sell tickets at rate of a fare and a third for the round trip on the certificate plan. To many old-time operators the B. & O. recalls many thrilling episodes of the war in which they were unseen but powerful participants. The B. &. O., like all other institutions, has expanded in modern times and now its lines and connections extend throughout the North, East and West, with its tickets on sale at all principal offices throughout the country. Solid vestibuled limited express trains with Pullman parlor or sleeping cars, as the exigencies of travel require, run between the East and West, connecting New York, Philadelphia, Baltimore and Washington of the East, *via* the famous Royal Blue Line, with Pittsburgh, Columbus, Chicago, Cincinnati and St. Louis of the West. All through trains run *via* Washington.

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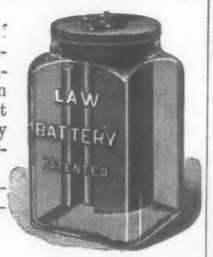

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ELECTRICAL PATENTS

INDEX OF INVENTIONS FOR WHICH LETTERS PATENTS OF THE UNITED STATES WERE ISSUED ON AUGUST 4, 1891.

456,940 **Electro-magnet cut-out;** Sylvanus H. Cobb, Hyde Park, Mass., assignor to the Electrical Safety Co., Portland, Me.

456,970 **Car propelled by electricity.** 457,015 Trolley for electric railways. 457,226 Brush holder for dynamo-electric machines; Sydney H. Short, Cleveland, O., assignor to Short Electric Railway Co., same place.

456,979 **System for conducting electric currents;** Edward Britt, Davenport, Ia., assignor of one-half to Oswald Hill, same place.

456,997 **Coupling for electric light shades;** Phillip Levison, Chicago, Ill.

457,016 **Electric car brake;** Edmond Verstraete, St. Louis, Mo., assignor of one-half to Peter M. Kling, same place.

457,030 **Electric clock;** Walter K. Menus and Walter J. Dudley, Everet, Mass., assignor to the Waltham Electric Clock Co., of New Hampshire.

457,036 **Electric motors for street cars;** Elihu Thomson, Swampscott, and Edwin W. Rice, Jr., Lynn, Mass.

457,058 **Electric track signal;** Myron W. Parrish, Detroit, Mich.

457,065 **Armature for dynamos or motors and method of winding the same;** Ferdinand A. Wessel, Brooklyn, assignor to the Excelsior Electric Co., New York, N. Y.

457,067 **Electric car brake;** Craig R. Arnold, Sharon Hill, Pa.

457,072 **Incandescent lamp socket;** Waldo C. Bryant, Bridgeport, Conn.

457,102 **Electric railway motor;** Norman C. Bassett, Lynn, Mass., assignor to the Thomson-Houston Electric Co. of Connecticut.

457,105 **Electric conductor support.** 457,106 Electric conductor; Eben M. Boynton, West Newbury, Mass., assignor to Boynton Bicycle Railway Co.

457,109 **Socket for incandescent electric lamps;** John Criggal, Newark, N. J.

457,110 **Mechanical switch for electric systems;** Christian Dauffenbach, Milwaukee, Wis.

457,116 **Galvanic battery;** John R. Hard, New York, N. Y.

457,127 **Electric hand fan;** Wm. B. Luce, Boston, Mass.

457,141 **Electric arc lamp;** Xavier Wertz, New York, N. Y.

457,151 **Coupling for electric incandescent lamps;** Isaac J. Flagg, Clinton, Mass.

457,164 **Electric smoothing iron;** Willis Mitchel, Malden, Mass., assignor to the Butterfield-Mitchell Electric Heating Co.

457,240 **Electric railway;** Samuel E. Wheatley and John W. Schlosser, Washington, D. C., assignor to the Wheless Electric Railway Co., same place.

457,296 **Electric fence station device;** David H. Wilson, Normal, assignor to American Electric Fence Co., Chicago, Ill.

457,300 **Electric switch;** Waldo C. Bryant, Bridgeport, Conn., assignor to the Bryant Electric Co., same place.

457,301 **Electric switch;** Lewis D. Castor, Philadelphia, Pa., assignor to Wm. H. Weston & Co., same place.

457,330 **Automatic brush shifter for dynamo-electric machines;** Thomas E. Adams, Cleveland, O., assignor to the Brush Electric Co.

REISSUES.

11,185 **Electric elevator;** Francis B. Perkins, Boston, Mass.

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